

CEIT – 04 – 502A
EE04L / MWF / 4:30p – 6:00p
LABORATORY REPORT 4

GROUP 6

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Machine Problem 4: Iterative Method of Solution for System of Linear Equations

Program Name: Group 6 System of Linear Equations Iterative Methods Approximator

Acronym: G6–SLEIMA

Current Version: 1.0.1

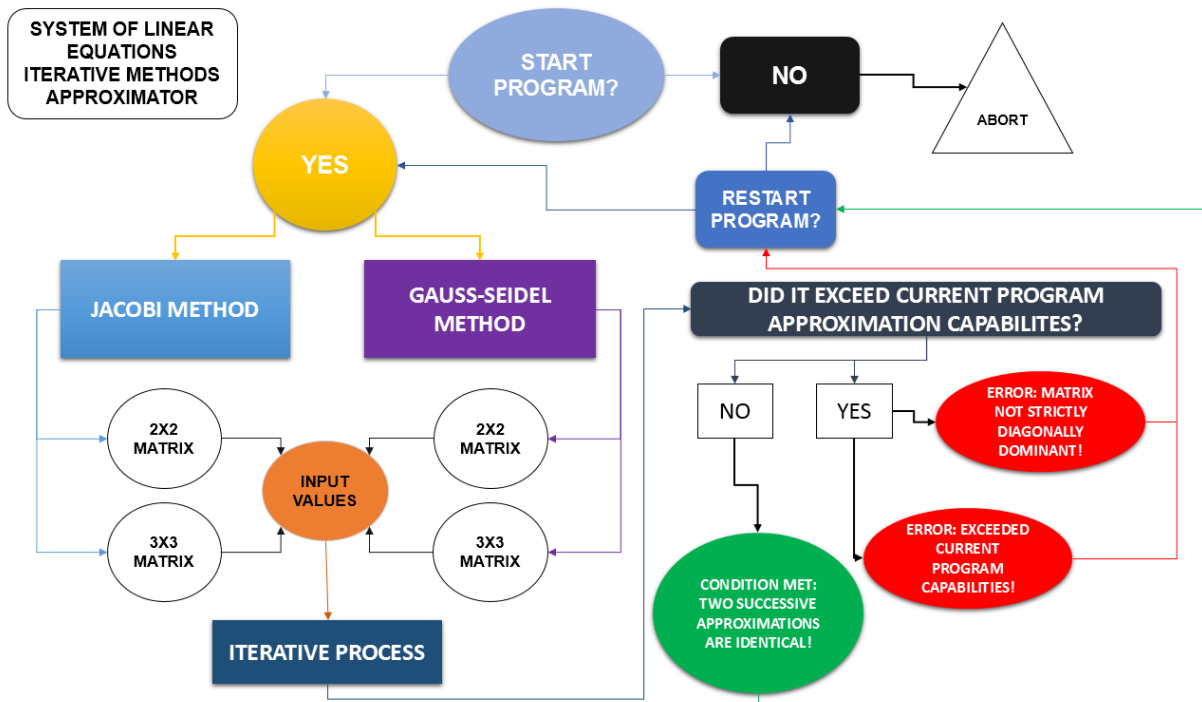
Version History:

- **1.0.1**
 - Trial version
 - Designed in Scilab version 6.0.2
 - Jacobi Method Mode can only approximate up to 25th approximation
 - Gauss-Seidel Method Mode can only approximate up to 25th approximation
 - Installed new “Clock” feature

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I. Flow Chart



G6-SLEIMA is an interactive program that requires user inputs in order to perform calculations of iterative approximations until a certain success or error condition is met. It features two program modes, “**Jacobi Method**” and “**Gauss-Seidel Method**” and are also further classified into two categories, “**2x2 matrix**” and “**3x3 matrix**”. This is because the program itself was only designed to solve 2x2 and 3x3 matrices of linear equations. The success rate of achieving the condition: “**two successive approximations are identical**” is **100%**, provided that approximations do not exceed the 25th approximation, which is the max approximation limit of the current version of the program. Furthermore, compared to the programs that were designed in the past, G6-SLEIMA is designed to have a “**Clock**” feature which gives the user the option to restart or abort the program via being prompted by the console whenever the program meets the success or error conditions. This is to ensure that repetitive manual executions of scilab script are not required anymore, removing the sense of inconveniency for the user.

II. Source Code of the Working Program

```
clc
yes=1
YES=1
Yes=1
no=0
NO=0
No=0
disp("Welcome to Group 6 System of Linear Equations Iterative Methods Approximator 1.0.1 (G6-SLEIMA 1.0.1)!")
disp("Version: 1.0.1 (TRIAL VERSION)")
disp("")
disp("Current Version Capabilities:")
disp("Jacobi Method: Can approximate up to 25th approximation.")
disp("Gauss-Seidel Method: Can approximate up to 25th approximation.")
disp("")
disp("")
ANSWER0=input (" Start program? input Yes to start and No to abort: ")
clock=100000
while clock>0
    if ANSWER0==1 then
        clc
        a=213
        b=321
        A=213
        B=321
        disp("Please choose desired program mode:")
        disp("(a) Jacobi Method")
        disp("(b) Gauss-Seidel Method")
        disp("")
        ANSWER1=input (" Your choice: ")
        if ANSWER1==213 then
            clc
            a=123
            b=213
            A=123
            B=213
            disp("Program Mode: Jacobi Method")
            disp("What are the parameters of your system/matrix?")
            disp("(a) 2x2")
            disp("(b) 3x3")
            disp("")
            ANSWER2=input (" Your choice: ")
            if ANSWER2==123 then
                clc

                // 2X2 MATRIX JACOBI METHOD
                // INPUT REQUIRED VALUES

                disp("Program Mode: Jacobi Method")
                disp("System/Matrix Size: 2x2")
                disp("Instructions: Please input the values of your matrix.")
                disp("")
                disp("First Equation")
                disp("")
```

```

a11=input (" Please input a11: ")
a12=input (" Please input a12: ")
c1=input (" Please input c1: ")
if a11<0 then
    a11=a11*-1
    c1=c1*-1
elseif a11>0 then
    a12=a12*-1
end
disp("Second Equation")
disp("")
a21=input (" Please input a21: ")
a22=input (" Please input a22: ")
c2=input (" Please input c2: ")
if a22<0 then
    a22=a22*-1
    c2=c2*-1
elseif a22>0 then
    a21=a21*-1
end

// FIRST ITERATION

x1_1st=c1/a11
x1_1st_1=x1_1st*1000
x1_1st_2=round(x1_1st_1)
x1_1st_rounded=x1_1st_2/1000

x2_1st=c2/a22
x2_1st_1=x2_1st*1000
x2_1st_2=round(x2_1st_1)
x2_1st_rounded=x2_1st_2/1000

disp("FIRST ITERATION")
disp("x1: "+string(x1_1st_rounded)+"")
disp("x2: "+string(x2_1st_rounded)+"")

// SECOND ITERATION

x1_2nd=(c1+(a12*x2_1st_rounded))/a11
x1_2nd_1=x1_2nd*1000
x1_2nd_2=round(x1_2nd_1)
x1_2nd_rounded=x1_2nd_2/1000

x2_2nd=(c2+(a21*x1_1st_rounded))/a22
x2_2nd_1=x2_2nd*1000
x2_2nd_2=round(x2_2nd_1)
x2_2nd_rounded=x2_2nd_2/1000

disp("SECOND ITERATION")
disp("x1: "+string(x1_2nd_rounded)+"")
disp("x2: "+string(x2_2nd_rounded)+"")

if x1_2nd_rounded==x1_1st_rounded & x2_2nd_rounded==x2_1st_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
end

```

```

disp("x1: "+string(x1_2nd_rounded)+"" )
disp("x2: "+string(x2_2nd_rounded)+"" )
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// THIRD ITERATION

x1_3rd=(c1+(a12*x2_2nd_rounded))/a11
x1_3rd_1=x1_3rd*1000
x1_3rd_2=round(x1_3rd_1)
x1_3rd_rounded=x1_3rd_2/1000

x2_3rd=(c2+(a21*x1_2nd_rounded))/a22
x2_3rd_1=x2_3rd*1000
x2_3rd_2=round(x2_3rd_1)
x2_3rd_rounded=x2_3rd_2/1000

disp("THIRD ITERATION")
disp("x1: "+string(x1_3rd_rounded)+"" )
disp("x2: "+string(x2_3rd_rounded)+"" )

if x1_3rd_rounded==x1_2nd_rounded & x2_3rd_rounded==x2_2nd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_3rd_rounded)+"" )
    disp("x2: "+string(x2_3rd_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FOURTH ITERATION

x1_4th=(c1+(a12*x2_3rd_rounded))/a11

```

```

x1_4th_1=x1_4th*1000
x1_4th_2=round(x1_4th_1)
x1_4th_rounded=x1_4th_2/1000

x2_4th=(c2+(a21*x1_3rd_rounded))/a22
x2_4th_1=x2_4th*1000
x2_4th_2=round(x2_4th_1)
x2_4th_rounded=x2_4th_2/1000

disp("FOURTH ITERATION")
disp("x1: "+string(x1_4th_rounded)+"" )
disp("x2: "+string(x2_4th_rounded)+"" )

if x1_4th_rounded==x1_3rd_rounded & x2_4th_rounded==x2_3rd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_4th_rounded)+"" )
    disp("x2: "+string(x2_4th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

x1_3rd_rounded_absolute=abs(x1_3rd_rounded)
x2_3rd_rounded_absolute=abs(x2_3rd_rounded)
x1_4th_rounded_absolute=abs(x1_4th_rounded)
x2_4th_rounded_absolute=abs(x2_4th_rounded)
x1_divergence_initial_checking=(x1_4th_rounded_absolute+x1_3rd_rounded_absolute)/2
x2_divergence_initial_checking=(x2_4th_rounded_absolute+x2_3rd_rounded_absolute)/2

// FIFTH ITERATION

x1_5th=(c1+(a12*x2_4th_rounded))/a11
x1_5th_1=x1_5th*1000
x1_5th_2=round(x1_5th_1)
x1_5th_rounded=x1_5th_2/1000

x2_5th=(c2+(a21*x1_4th_rounded))/a22
x2_5th_1=x2_5th*1000
x2_5th_2=round(x2_5th_1)
x2_5th_rounded=x2_5th_2/1000

disp("FIFTH ITERATION")
disp("x1: "+string(x1_5th_rounded)+"" )
disp("x2: "+string(x2_5th_rounded)+"" )

```

```

if x1_5th_rounded==x1_4th_rounded & x2_5th_rounded==x2_4th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_5th_rounded)+"")
    disp("x2: "+string(x2_5th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

x1_5th_rounded_absolute=abs(x1_5th_rounded)
x2_5th_rounded_absolute=abs(x2_5th_rounded)
x1_divergence_final_checking=(x1_5th_rounded_absolute+x1_4th_rounded_absolute)/2
x2_divergence_final_checking=(x2_5th_rounded_absolute+x2_4th_rounded_absolute)/2

// SIXTH ITERATION

x1_6th=(c1+(a12*x2_5th_rounded))/a11
x1_6th_1=x1_6th*1000
x1_6th_2=round(x1_6th_1)
x1_6th_rounded=x1_6th_2/1000

x2_6th=(c2+(a21*x1_5th_rounded))/a22
x2_6th_1=x2_6th*1000
x2_6th_2=round(x2_6th_1)
x2_6th_rounded=x2_6th_2/1000

disp("SIXTH ITERATION")
disp("x1: "+string(x1_6th_rounded)+"")
disp("x2: "+string(x2_6th_rounded)+"")

if x1_6th_rounded==x1_5th_rounded & x2_6th_rounded==x2_5th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_6th_rounded)+"")
    disp("x2: "+string(x2_6th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")

```

```

        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SEVENTH ITERATION

x1_7th=(c1+(a12*x2_6th_rounded))/a11
x1_7th_1=x1_7th*1000
x1_7th_2=round(x1_7th_1)
x1_7th_rounded=x1_7th_2/1000

x2_7th=(c2+(a21*x1_6th_rounded))/a22
x2_7th_1=x2_7th*1000
x2_7th_2=round(x2_7th_1)
x2_7th_rounded=x2_7th_2/1000

disp("SEVENTH ITERATION")
disp("x1: "+string(x1_7th_rounded)+"" )
disp("x2: "+string(x2_7th_rounded)+"" )

if x1_7th_rounded==x1_6th_rounded & x2_7th_rounded==x2_6th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_7th_rounded)+"" )
    disp("x2: "+string(x2_7th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// EIGHTH ITERATION

x1_8th=(c1+(a12*x2_7th_rounded))/a11
x1_8th_1=x1_8th*1000
x1_8th_2=round(x1_8th_1)
x1_8th_rounded=x1_8th_2/1000

x2_8th=(c2+(a21*x1_7th_rounded))/a22
x2_8th_1=x2_8th*1000
x2_8th_2=round(x2_8th_1)
x2_8th_rounded=x2_8th_2/1000

disp("EIGHTH ITERATION")
disp("x1: "+string(x1_8th_rounded)+"" )
disp("x2: "+string(x2_8th_rounded)+"" )

```



```

if x1_8th_rounded==x1_7th_rounded & x2_8th_rounded==x2_7th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_8th_rounded)+"")
    disp("x2: "+string(x2_8th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

// NINTH ITERATION

```

x1_9th=(c1+(a12*x2_8th_rounded))/a11
x1_9th_1=x1_9th*1000
x1_9th_2=round(x1_9th_1)
x1_9th_rounded=x1_9th_2/1000

```

```

x2_9th=(c2+(a21*x1_8th_rounded))/a22
x2_9th_1=x2_9th*1000
x2_9th_2=round(x2_9th_1)
x2_9th_rounded=x2_9th_2/1000

```

```

disp("NINTH ITERATION")
disp("x1: "+string(x1_9th_rounded)+"")
disp("x2: "+string(x2_9th_rounded)+"")

```

```

if x1_9th_rounded==x1_8th_rounded & x2_9th_rounded==x2_8th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_9th_rounded)+"")
    disp("x2: "+string(x2_9th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

// TENTH ITERATION

```
x1_10th=(c1+(a12*x2_9th_rounded))/a11
x1_10th_1=x1_10th*1000
x1_10th_2=round(x1_10th_1)
x1_10th_rounded=x1_10th_2/1000
```

```
x2_10th=(c2+(a21*x1_9th_rounded))/a22
x2_10th_1=x2_10th*1000
x2_10th_2=round(x2_10th_1)
x2_10th_rounded=x2_10th_2/1000
```

```
disp("TENTH ITERATION")
disp("x1: "+string(x1_10th_rounded)+"")
disp("x2: "+string(x2_10th_rounded)+"")
```

```
if x1_10th_rounded==x1_9th_rounded & x2_10th_rounded==x2_9th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_10th_rounded)+"")
    disp("x2: "+string(x2_10th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end
```

// ELEVENTH ITERATION

```
x1_11th=(c1+(a12*x2_10th_rounded))/a11
x1_11th_1=x1_11th*1000
x1_11th_2=round(x1_11th_1)
x1_11th_rounded=x1_11th_2/1000
```

```
x2_11th=(c2+(a21*x1_10th_rounded))/a22
x2_11th_1=x2_11th*1000
x2_11th_2=round(x2_11th_1)
x2_11th_rounded=x2_11th_2/1000
```

```
disp("ELEVENTH ITERATION")
disp("x1: "+string(x1_11th_rounded)+"")
disp("x2: "+string(x2_11th_rounded)+"")
```

```
if x1_11th_rounded==x1_10th_rounded & x2_11th_rounded==x2_10th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
```

```

disp("x1: "+string(x1_11th_rounded)+"" )
disp("x2: "+string(x2_11th_rounded)+"" )
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// TWELFTH ITERATION

x1_12th=(c1+(a12*x2_11th_rounded))/a11
x1_12th_1=x1_12th*1000
x1_12th_2=round(x1_12th_1)
x1_12th_rounded=x1_12th_2/1000

x2_12th=(c2+(a21*x1_11th_rounded))/a22
x2_12th_1=x2_12th*1000
x2_12th_2=round(x2_12th_1)
x2_12th_rounded=x2_12th_2/1000

disp("TWELFTH ITERATION")
disp("x1: "+string(x1_12th_rounded)+"" )
disp("x2: "+string(x2_12th_rounded)+"" )

if x1_12th_rounded==x1_11th_rounded & x2_12th_rounded==x2_11th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_12th_rounded)+"" )
    disp("x2: "+string(x2_12th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// THIRTEENTH ITERATION

x1_13th=(c1+(a12*x2_12th_rounded))/a11

```

```

x1_13th_1=x1_13th*1000
x1_13th_2=round(x1_13th_1)
x1_13th_rounded=x1_13th_2/1000

x2_13th=(c2+(a21*x1_12th_rounded))/a22
x2_13th_1=x2_13th*1000
x2_13th_2=round(x2_13th_1)
x2_13th_rounded=x2_13th_2/1000

disp("THIRTEENTH ITERATION")
disp("x1: "+string(x1_13th_rounded)+""")
disp("x2: "+string(x2_13th_rounded)+""")

if x1_13th_rounded==x1_12th_rounded & x2_13th_rounded==x2_12th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_13th_rounded)+""")
    disp("x2: "+string(x2_13th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FOURTEENTH ITERATION

x1_14th=(c1+(a12*x2_13th_rounded))/a11
x1_14th_1=x1_14th*1000
x1_14th_2=round(x1_14th_1)
x1_14th_rounded=x1_14th_2/1000

x2_14th=(c2+(a21*x1_13th_rounded))/a22
x2_14th_1=x2_14th*1000
x2_14th_2=round(x2_14th_1)
x2_14th_rounded=x2_14th_2/1000

disp("FOURTEENTH ITERATION")
disp("x1: "+string(x1_14th_rounded)+""")
disp("x2: "+string(x2_14th_rounded)+""")

if x1_14th_rounded==x1_13th_rounded & x2_14th_rounded==x2_13th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_14th_rounded)+""")
    disp("x2: "+string(x2_14th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")

```

```

disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// FIFTEENTH ITERATION

x1_15th=(c1+(a12*x2_14th_rounded))/a11
x1_15th_1=x1_15th*1000
x1_15th_2=round(x1_15th_1)
x1_15th_rounded=x1_15th_2/1000

x2_15th=(c2+(a21*x1_14th_rounded))/a22
x2_15th_1=x2_15th*1000
x2_15th_2=round(x2_15th_1)
x2_15th_rounded=x2_15th_2/1000

disp("FIFTEENTH ITERATION")
disp("x1: "+string(x1_15th_rounded)+"" )
disp("x2: "+string(x2_15th_rounded)+"" )

if x1_15th_rounded==x1_14th_rounded & x2_15th_rounded==x2_14th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_15th_rounded)+"" )
    disp("x2: "+string(x2_15th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SIXTEENTH ITERATION

x1_16th=(c1+(a12*x2_15th_rounded))/a11
x1_16th_1=x1_16th*1000
x1_16th_2=round(x1_16th_1)
x1_16th_rounded=x1_16th_2/1000

```

```

x2_16th=(c2+(a21*x1_15th_rounded))/a22
x2_16th_1=x2_16th*1000
x2_16th_2=round(x2_16th_1)
x2_16th_rounded=x2_16th_2/1000

disp("SIXTEENTH ITERATION")
disp("x1: "+string(x1_16th_rounded)+"" )
disp("x2: "+string(x2_16th_rounded)+"" )

if x1_16th_rounded==x1_15th_rounded & x2_16th_rounded==x2_15th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_16th_rounded)+"" )
    disp("x2: "+string(x2_16th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SEVENTEENTH ITERATION

x1_17th=(c1+(a12*x2_16th_rounded))/a11
x1_17th_1=x1_17th*1000
x1_17th_2=round(x1_17th_1)
x1_17th_rounded=x1_17th_2/1000

x2_17th=(c2+(a21*x1_16th_rounded))/a22
x2_17th_1=x2_17th*1000
x2_17th_2=round(x2_17th_1)
x2_17th_rounded=x2_17th_2/1000

disp("SEVENTEENTH ITERATION")
disp("x1: "+string(x1_17th_rounded)+"" )
disp("x2: "+string(x2_17th_rounded)+"" )

if x1_17th_rounded==x1_16th_rounded & x2_17th_rounded==x2_16th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_17th_rounded)+"" )
    disp("x2: "+string(x2_17th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    end
end

```

```

elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// EIGHTEENTH ITERATION

x1_18th=(c1+(a12*x2_17th_rounded))/a11
x1_18th_1=x1_18th*1000
x1_18th_2=round(x1_18th_1)
x1_18th_rounded=x1_18th_2/1000

x2_18th=(c2+(a21*x1_17th_rounded))/a22
x2_18th_1=x2_18th*1000
x2_18th_2=round(x2_18th_1)
x2_18th_rounded=x2_18th_2/1000

disp("EIGHTEENTH ITERATION")
disp("x1: "+string(x1_18th_rounded)+"")
disp("x2: "+string(x2_18th_rounded)+"")

if x1_18th_rounded==x1_17th_rounded & x2_18th_rounded==x2_17th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_18th_rounded)+"")
    disp("x2: "+string(x2_18th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// NINETEENTH ITERATION

x1_19th=(c1+(a12*x2_18th_rounded))/a11
x1_19th_1=x1_19th*1000
x1_19th_2=round(x1_19th_1)
x1_19th_rounded=x1_19th_2/1000

x2_19th=(c2+(a21*x1_18th_rounded))/a22
x2_19th_1=x2_19th*1000
x2_19th_2=round(x2_19th_1)
x2_19th_rounded=x2_19th_2/1000

```

```

disp("NINETEENTH ITERATION")
disp("x1: "+string(x1_19th_rounded)+"")
disp("x2: "+string(x2_19th_rounded)+"")

if x1_19th_rounded==x1_18th_rounded & x2_19th_rounded==x2_18th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_19th_rounded)+"")
    disp("x2: "+string(x2_19th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTIETH ITERATION

x1_20th=(c1+(a12*x2_19th_rounded))/a11
x1_20th_1=x1_20th*1000
x1_20th_2=round(x1_20th_1)
x1_20th_rounded=x1_20th_2/1000

x2_20th=(c2+(a21*x1_19th_rounded))/a22
x2_20th_1=x2_20th*1000
x2_20th_2=round(x2_20th_1)
x2_20th_rounded=x2_20th_2/1000

disp("TWENTIETH ITERATION")
disp("x1: "+string(x1_20th_rounded)+"")
disp("x2: "+string(x2_20th_rounded)+"")

if x1_20th_rounded==x1_19th_rounded & x2_20th_rounded==x2_19th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_20th_rounded)+"")
    disp("x2: "+string(x2_20th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")

```



```

        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-FIRST ITERATION

x1_21st=(c1+(a12*x2_20th_rounded))/a11
x1_21st_1=x1_21st*1000
x1_21st_2=round(x1_21st_1)
x1_21st_rounded=x1_21st_2/1000

x2_21st=(c2+(a21*x1_20th_rounded))/a22
x2_21st_1=x2_21st*1000
x2_21st_2=round(x2_21st_1)
x2_21st_rounded=x2_21st_2/1000

disp("TWENTY-FIRST ITERATION")
disp("x1: "+string(x1_21st_rounded)+""")
disp("x2: "+string(x2_21st_rounded)+""")

if x1_21st_rounded==x1_20th_rounded & x2_21st_rounded==x2_20th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_21st_rounded)+""")
    disp("x2: "+string(x2_21st_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-SECOND ITERATION

x1_22nd=(c1+(a12*x2_21st_rounded))/a11
x1_22nd_1=x1_22nd*1000
x1_22nd_2=round(x1_22nd_1)
x1_22nd_rounded=x1_22nd_2/1000

x2_22nd=(c2+(a21*x1_21st_rounded))/a22
x2_22nd_1=x2_22nd*1000
x2_22nd_2=round(x2_22nd_1)
x2_22nd_rounded=x2_22nd_2/1000

disp("TWENTY-SECOND ITERATION")
disp("x1: "+string(x1_22nd_rounded)+""")
disp("x2: "+string(x2_22nd_rounded)+""")

```

```

if x1_22nd_rounded==x1_21st_rounded & x2_22nd_rounded==x2_21st_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_22nd_rounded)+"")
    disp("x2: "+string(x2_22nd_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

// TWENTY-THIRD ITERATION

```

x1_23rd=(c1+(a12*x2_22nd_rounded))/a11
x1_23rd_1=x1_23rd*1000
x1_23rd_2=round(x1_23rd_1)
x1_23rd_rounded=x1_23rd_2/1000

```

```

x2_23rd=(c2+(a21*x1_22nd_rounded))/a22
x2_23rd_1=x2_23rd*1000
x2_23rd_2=round(x2_23rd_1)
x2_23rd_rounded=x2_23rd_2/1000

```

```

disp("TWENTY-THIRD ITERATION")
disp("x1: "+string(x1_23rd_rounded)+"")
disp("x2: "+string(x2_23rd_rounded)+"")

```

```

if x1_23rd_rounded==x1_22nd_rounded & x2_23rd_rounded==x2_22nd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_23rd_rounded)+"")
    disp("x2: "+string(x2_23rd_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

```
// TWENTY-FOURTH ITERATION
```

```
x1_24th=(c1+(a12*x2_23rd_rounded))/a11  
x1_24th_1=x1_24th*1000  
x1_24th_2=round(x1_24th_1)  
x1_24th_rounded=x1_24th_2/1000
```

```
x2_24th=(c2+(a21*x1_23rd_rounded))/a22  
x2_24th_1=x2_24th*1000  
x2_24th_2=round(x2_24th_1)  
x2_24th_rounded=x2_24th_2/1000
```

```
disp("TWENTY-FOURTH ITERATION")  
disp("x1: "+string(x1_24th_rounded)+"" )  
disp("x2: "+string(x2_24th_rounded)+"" )
```

```
if x1_24th_rounded==x1_23rd_rounded & x2_24th_rounded==x2_23rd_rounded then  
    disp("")  
    disp("CONDITION MET: Two successive approximations are identical.")  
    disp("x1: "+string(x1_24th_rounded)+"" )  
    disp("x2: "+string(x2_24th_rounded)+"" )  
    disp("")  
    disp("Restart the program? Input Yes to restart and No to abort.")  
    disp("")  
    ANSWER_RESTART=input (" Your Choice: ")  
    if ANSWER_RESTART==1 then  
        continue  
    elseif ANSWER_RESTART==0 then  
        clc  
        disp("Thank you for using our program!")  
        disp("For any inquiries, please contact Head Developer through this email:")  
        disp("bernardoraevon@gmail.com")  
        abort  
    end  
end
```

```
// TWENTY-FIFTH ITERATION
```

```
x1_25th=(c1+(a12*x2_24th_rounded))/a11  
x1_25th_1=x1_25th*1000  
x1_25th_2=round(x1_25th_1)  
x1_25th_rounded=x1_25th_2/1000
```

```
x2_25th=(c2+(a21*x1_24th_rounded))/a22  
x2_25th_1=x2_25th*1000  
x2_25th_2=round(x2_25th_1)  
x2_25th_rounded=x2_25th_2/1000
```

```
disp("TWENTY-FIFTH ITERATION")  
disp("x1: "+string(x1_25th_rounded)+"" )  
disp("x2: "+string(x2_25th_rounded)+"" )
```

```
if x1_25th_rounded==x1_24th_rounded & x2_25th_rounded==x2_24th_rounded then  
    disp("")  
    disp("CONDITION MET: Two successive approximations are identical.")
```

```

disp("x1: "+string(x1_25th_rounded)+")
disp("x2: "+string(x2_25th_rounded)+")
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end

// CONDITION: MUST BE STRICTLY DIAGONALLY DOMINANT

elseif x1_divergence_final_checking>x1_divergence_initial_checking &
x2_divergence_final_checking>x2_divergence_initial_checking then
    disp("")
    disp("ERROR: Divergences of approximations are occurring! This may be because of the matrix
provided, which may not be strictly diagonally dominant!")
    disp("RECOMMENDED ACTION: Interchange the rows inside your matrix such that the matrix is
strictly diagonally dominant.")
    disp("IMPORTANT NOTE: This conditional error may not always be the case. Although it is important
to take note of that Jacobi Method always CONVERGES.")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
else
    disp("")
    disp("ERROR: EXCEEDED THE APPROXIMATING CAPABILITIES OF THE PROGRAM!")
    disp("RECOMMENDED ACTION: Switch to Gauss-Seidel Method. You can also wait for the next
update of this program.")
    disp("For any inquiries, please contact Head Developer through email: bernardoraevon@gmail.com")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")

```

```

        disp("bernardoraevon@gmail.com")
        abort
    end
end
elseif ANSWER2==213 then
    clc

    // 3X3 MATRIX JACOBI METHOD
    // INPUT REQUIRED VALUES

    disp("Program Mode: Jacobi Method")
    disp("System/Matrix Size: 3x3")
    disp("Instructions: Please input the values of your matrix.")
    disp("")
    disp("First Equation")
    disp("")
    a11=input (" Please input a11: ")
    a12=input (" Please input a12: ")
    a13=input (" Please input a13: ")
    c1=input (" Please input c1: ")
    if a11<0 then
        a11=a11*-1
        c1=c1*-1
    elseif a11>0 then
        a12=a12*-1
        a13=a13*-1
    end
    disp("Second Equation")
    disp("")
    a21=input (" Please input a21: ")
    a22=input (" Please input a22: ")
    a23=input (" Please input a23: ")
    c2=input (" Please input c2: ")
    if a22<0 then
        a22=a22*-1
        c2=c2*-1
    elseif a22>0 then
        a21=a21*-1
        a23=a23*-1
    end
    disp("Third Equation")
    disp("")
    a31=input (" Please input a31: ")
    a32=input (" Please input a32: ")
    a33=input (" Please input a33: ")
    c3=input (" Please input c3: ")
    if a33<0 then
        a33=a33*-1
        c3=c3*-1
    elseif a33>0 then
        a31=a31*-1
        a32=a32*-1
    end

    // FIRST ITERATION

```

```

x1_1st=c1/a11
x1_1st_1=x1_1st*1000
x1_1st_2=round(x1_1st_1)
x1_1st_rounded=x1_1st_2/1000

x2_1st=c2/a22
x2_1st_1=x2_1st*1000
x2_1st_2=round(x2_1st_1)
x2_1st_rounded=x2_1st_2/1000

x3_1st=c3/a33
x3_1st_1=x3_1st*1000
x3_1st_2=round(x3_1st_1)
x3_1st_rounded=x3_1st_2/1000

disp("FIRST ITERATION")
disp("x1: "+string(x1_1st_rounded)+"")
disp("x2: "+string(x2_1st_rounded)+"")
disp("x3: "+string(x3_1st_rounded)+"")

// SECOND ITERATION

x1_2nd=(c1+(a12*x2_1st_rounded)+(a13*x3_1st_rounded))/a11
x1_2nd_1=x1_2nd*1000
x1_2nd_2=round(x1_2nd_1)
x1_2nd_rounded=x1_2nd_2/1000

x2_2nd=(c2+(a21*x1_1st_rounded)+(a23*x3_1st_rounded))/a22
x2_2nd_1=x2_2nd*1000
x2_2nd_2=round(x2_2nd_1)
x2_2nd_rounded=x2_2nd_2/1000

x3_2nd=(c3+(a31*x1_1st_rounded)+(a32*x2_1st_rounded))/a33
x3_2nd_1=x3_2nd*1000
x3_2nd_2=round(x3_2nd_1)
x3_2nd_rounded=x3_2nd_2/1000

disp("SECOND ITERATION")
disp("x1: "+string(x1_2nd_rounded)+"")
disp("x2: "+string(x2_2nd_rounded)+"")
disp("x3: "+string(x3_2nd_rounded)+"")

if x1_2nd_rounded==x1_1st_rounded & x2_2nd_rounded==x2_1st_rounded &
x3_2nd_rounded==x3_1st_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_2nd_rounded)+"")
    disp("x2: "+string(x2_2nd_rounded)+"")
    disp("x3: "+string(x3_2nd_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then

```

```

    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// THIRD ITERATION

x1_3rd=(c1+(a12*x2_2nd_rounded)+(a13*x3_2nd_rounded))/a11
x1_3rd_1=x1_3rd*1000
x1_3rd_2=round(x1_3rd_1)
x1_3rd_rounded=x1_3rd_2/1000

x2_3rd=(c2+(a21*x1_2nd_rounded)+(a23*x3_2nd_rounded))/a22
x2_3rd_1=x2_3rd*1000
x2_3rd_2=round(x2_3rd_1)
x2_3rd_rounded=x2_3rd_2/1000

x3_3rd=(c3+(a31*x1_2nd_rounded)+(a32*x2_2nd_rounded))/a33
x3_3rd_1=x3_3rd*1000
x3_3rd_2=round(x3_3rd_1)
x3_3rd_rounded=x3_3rd_2/1000

disp("THIRD ITERATION")
disp("x1: "+string(x1_3rd_rounded)+""")
disp("x2: "+string(x2_3rd_rounded)+""")
disp("x3: "+string(x3_3rd_rounded)+""")

if x1_3rd_rounded==x1_2nd_rounded & x2_3rd_rounded==x2_2nd_rounded &
x3_3rd_rounded==x3_2nd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_3rd_rounded)+""")
    disp("x2: "+string(x2_3rd_rounded)+""")
    disp("x3: "+string(x3_3rd_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FOURTH ITERATION

x1_4th=(c1+(a12*x2_3rd_rounded)+(a13*x3_3rd_rounded))/a11
x1_4th_1=x1_4th*1000

```

```

x1_4th_2=round(x1_4th_1)
x1_4th_rounded=x1_4th_2/1000

x2_4th=(c2+(a21*x1_3rd_rounded)+(a23*x3_3rd_rounded))/a22
x2_4th_1=x2_4th*1000
x2_4th_2=round(x2_4th_1)
x2_4th_rounded=x2_4th_2/1000

x3_4th=(c3+(a31*x1_3rd_rounded)+(a32*x2_3rd_rounded))/a33
x3_4th_1=x3_4th*1000
x3_4th_2=round(x3_4th_1)
x3_4th_rounded=x3_4th_2/1000

disp("FOURTH ITERATION")
disp("x1: "+string(x1_4th_rounded)+""")
disp("x2: "+string(x2_4th_rounded)+""")
disp("x3: "+string(x3_4th_rounded)+""")

if x1_4th_rounded==x1_3rd_rounded & x2_4th_rounded==x2_3rd_rounded &
x3_4th_rounded==x3_3rd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_4th_rounded)+""")
    disp("x2: "+string(x2_4th_rounded)+""")
    disp("x3: "+string(x3_4th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

x1_3rd_rounded_absolute=abs(x1_3rd_rounded)
x2_3rd_rounded_absolute=abs(x2_3rd_rounded)
x3_3rd_rounded_absolute=abs(x3_3rd_rounded)
x1_4th_rounded_absolute=abs(x1_4th_rounded)
x2_4th_rounded_absolute=abs(x2_4th_rounded)
x3_4th_rounded_absolute=abs(x3_4th_rounded)
x1_divergence_initial_checking=(x1_4th_rounded_absolute+x1_3rd_rounded_absolute)/2
x2_divergence_initial_checking=(x2_4th_rounded_absolute+x2_3rd_rounded_absolute)/2
x3_divergence_initial_checking=(x3_4th_rounded_absolute+x3_3rd_rounded_absolute)/2

// FIFTH ITERATION

x1_5th=(c1+(a12*x2_4th_rounded)+(a13*x3_4th_rounded))/a11
x1_5th_1=x1_5th*1000
x1_5th_2=round(x1_5th_1)
x1_5th_rounded=x1_5th_2/1000

```



```

x2_5th=(c2+(a21*x1_4th_rounded)+(a23*x3_4th_rounded))/a22
x2_5th_1=x2_5th*1000
x2_5th_2=round(x2_5th_1)
x2_5th_rounded=x2_5th_2/1000

x3_5th=(c3+(a31*x1_4th_rounded)+(a32*x2_4th_rounded))/a33
x3_5th_1=x3_5th*1000
x3_5th_2=round(x3_5th_1)
x3_5th_rounded=x3_5th_2/1000

disp("FIFTH ITERATION")
disp("x1: "+string(x1_5th_rounded)+"" )
disp("x2: "+string(x2_5th_rounded)+"" )
disp("x3: "+string(x3_5th_rounded)+"" )

if x1_5th_rounded==x1_4th_rounded & x2_5th_rounded==x2_4th_rounded &
x3_5th_rounded==x3_4th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_5th_rounded)+"" )
    disp("x2: "+string(x2_5th_rounded)+"" )
    disp("x3: "+string(x3_5th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end
x1_5th_rounded_absolute=abs(x1_5th_rounded)
x2_5th_rounded_absolute=abs(x2_5th_rounded)
x3_5th_rounded_absolute=abs(x3_5th_rounded)
x1_divergence_final_checking=(x1_5th_rounded_absolute+x1_4th_rounded_absolute)/2
x2_divergence_final_checking=(x2_5th_rounded_absolute+x2_4th_rounded_absolute)/2
x3_divergence_final_checking=(x3_5th_rounded_absolute+x3_4th_rounded_absolute)/2

// SIXTH ITERATION

x1_6th=(c1+(a12*x2_5th_rounded)+(a13*x3_5th_rounded))/a11
x1_6th_1=x1_6th*1000
x1_6th_2=round(x1_6th_1)
x1_6th_rounded=x1_6th_2/1000

x2_6th=(c2+(a21*x1_5th_rounded)+(a23*x3_5th_rounded))/a22
x2_6th_1=x2_6th*1000
x2_6th_2=round(x2_6th_1)
x2_6th_rounded=x2_6th_2/1000

```

```

x3_6th=(c3+(a31*x1_5th_rounded)+(a32*x2_5th_rounded))/a33
x3_6th_1=x3_6th*1000
x3_6th_2=round(x3_6th_1)
x3_6th_rounded=x3_6th_2/1000

disp("SIXTH ITERATION")
disp("x1: "+string(x1_6th_rounded)+"" )
disp("x2: "+string(x2_6th_rounded)+"" )
disp("x3: "+string(x3_6th_rounded)+"" )

if x1_6th_rounded==x1_5th_rounded & x2_6th_rounded==x2_5th_rounded &
x3_6th_rounded==x3_5th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_6th_rounded)+"" )
    disp("x2: "+string(x2_6th_rounded)+"" )
    disp("x3: "+string(x3_6th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SEVENTH ITERATION

x1_7th=(c1+(a12*x2_6th_rounded)+(a13*x3_6th_rounded))/a11
x1_7th_1=x1_7th*1000
x1_7th_2=round(x1_7th_1)
x1_7th_rounded=x1_7th_2/1000

x2_7th=(c2+(a21*x1_6th_rounded)+(a23*x3_6th_rounded))/a22
x2_7th_1=x2_7th*1000
x2_7th_2=round(x2_7th_1)
x2_7th_rounded=x2_7th_2/1000

x3_7th=(c3+(a31*x1_6th_rounded)+(a32*x2_6th_rounded))/a33
x3_7th_1=x3_7th*1000
x3_7th_2=round(x3_7th_1)
x3_7th_rounded=x3_7th_2/1000

disp("SEVENTH ITERATION")
disp("x1: "+string(x1_7th_rounded)+"" )
disp("x2: "+string(x2_7th_rounded)+"" )
disp("x3: "+string(x3_7th_rounded)+"" )

if x1_7th_rounded==x1_6th_rounded & x2_7th_rounded==x2_6th_rounded &
x3_7th_rounded==x3_6th_rounded then

```

```

disp("")
disp("CONDITION MET: Two successive approximations are identical.")
disp("x1: "+string(x1_7th_rounded)+"")
disp("x2: "+string(x2_7th_rounded)+"")
disp("x3: "+string(x3_7th_rounded)+"")
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// EIGHTH ITERATION

x1_8th=(c1+(a12*x2_7th_rounded)+(a13*x3_7th_rounded))/a11
x1_8th_1=x1_8th*1000
x1_8th_2=round(x1_8th_1)
x1_8th_rounded=x1_8th_2/1000

x2_8th=(c2+(a21*x1_7th_rounded)+(a23*x3_7th_rounded))/a22
x2_8th_1=x2_8th*1000
x2_8th_2=round(x2_8th_1)
x2_8th_rounded=x2_8th_2/1000

x3_8th=(c3+(a31*x1_7th_rounded)+(a32*x2_7th_rounded))/a33
x3_8th_1=x3_8th*1000
x3_8th_2=round(x3_8th_1)
x3_8th_rounded=x3_8th_2/1000

disp("EIGHTH ITERATION")
disp("x1: "+string(x1_8th_rounded)+"")
disp("x2: "+string(x2_8th_rounded)+"")
disp("x3: "+string(x3_8th_rounded)+"")

if x1_8th_rounded==x1_7th_rounded & x2_8th_rounded==x2_7th_rounded &
x3_8th_rounded==x3_7th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_8th_rounded)+"")
    disp("x2: "+string(x2_8th_rounded)+"")
    disp("x3: "+string(x3_8th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then

```

```

        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// NINTH ITERATION

x1_9th=(c1+(a12*x2_8th_rounded)+(a13*x3_8th_rounded))/a11
x1_9th_1=x1_9th*1000
x1_9th_2=round(x1_9th_1)
x1_9th_rounded=x1_9th_2/1000

x2_9th=(c2+(a21*x1_8th_rounded)+(a23*x3_8th_rounded))/a22
x2_9th_1=x2_9th*1000
x2_9th_2=round(x2_9th_1)
x2_9th_rounded=x2_9th_2/1000

x3_9th=(c3+(a31*x1_8th_rounded)+(a32*x2_8th_rounded))/a33
x3_9th_1=x3_9th*1000
x3_9th_2=round(x3_9th_1)
x3_9th_rounded=x3_9th_2/1000

disp("NINTH ITERATION")
disp("x1: "+string(x1_9th_rounded)+""")
disp("x2: "+string(x2_9th_rounded)+""")
disp("x3: "+string(x3_9th_rounded)+""")

if x1_9th_rounded==x1_8th_rounded & x2_9th_rounded==x2_8th_rounded &
x3_9th_rounded==x3_8th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_9th_rounded)+""")
    disp("x2: "+string(x2_9th_rounded)+""")
    disp("x3: "+string(x3_9th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TENTH ITERATION

x1_10th=(c1+(a12*x2_9th_rounded)+(a13*x3_9th_rounded))/a11
x1_10th_1=x1_10th*1000

```

```

x1_10th_2=round(x1_10th_1)
x1_10th_rounded=x1_10th_2/1000

x2_10th=(c2+(a21*x1_9th_rounded)+(a23*x3_9th_rounded))/a22
x2_10th_1=x2_10th*1000
x2_10th_2=round(x2_10th_1)
x2_10th_rounded=x2_10th_2/1000

x3_10th=(c3+(a31*x1_9th_rounded)+(a32*x2_9th_rounded))/a33
x3_10th_1=x3_10th*1000
x3_10th_2=round(x3_10th_1)
x3_10th_rounded=x3_10th_2/1000

disp("TENTH ITERATION")
disp("x1: "+string(x1_10th_rounded)+"")
disp("x2: "+string(x2_10th_rounded)+"")
disp("x3: "+string(x3_10th_rounded)+"")

if x1_10th_rounded==x1_9th_rounded & x2_10th_rounded==x2_9th_rounded &
x3_10th_rounded==x3_9th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_10th_rounded)+"")
    disp("x2: "+string(x2_10th_rounded)+"")
    disp("x3: "+string(x3_10th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// ELEVENTH ITERATION

x1_11th=(c1+(a12*x2_10th_rounded)+(a13*x3_10th_rounded))/a11
x1_11th_1=x1_11th*1000
x1_11th_2=round(x1_11th_1)
x1_11th_rounded=x1_11th_2/1000

x2_11th=(c2+(a21*x1_10th_rounded)+(a23*x3_10th_rounded))/a22
x2_11th_1=x2_11th*1000
x2_11th_2=round(x2_11th_1)
x2_11th_rounded=x2_11th_2/1000

x3_11th=(c3+(a31*x1_10th_rounded)+(a32*x2_10th_rounded))/a33
x3_11th_1=x3_11th*1000
x3_11th_2=round(x3_11th_1)
x3_11th_rounded=x3_11th_2/1000

```

```

disp("ELEVENTH ITERATION")
disp("x1: "+string(x1_11th_rounded)+"")
disp("x2: "+string(x2_11th_rounded)+"")
disp("x3: "+string(x3_11th_rounded)+"")

if x1_11th_rounded==x1_10th_rounded & x2_11th_rounded==x2_10th_rounded &
x3_11th_rounded==x3_10th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_11th_rounded)+"")
    disp("x2: "+string(x2_11th_rounded)+"")
    disp("x3: "+string(x3_11th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWELFTH ITERATION

x1_12th=(c1+(a12*x2_11th_rounded)+(a13*x3_11th_rounded))/a11
x1_12th_1=x1_12th*1000
x1_12th_2=round(x1_12th_1)
x1_12th_rounded=x1_12th_2/1000

x2_12th=(c2+(a21*x1_11th_rounded)+(a23*x3_11th_rounded))/a22
x2_12th_1=x2_12th*1000
x2_12th_2=round(x2_12th_1)
x2_12th_rounded=x2_12th_2/1000

x3_12th=(c3+(a31*x1_11th_rounded)+(a32*x2_11th_rounded))/a33
x3_12th_1=x3_12th*1000
x3_12th_2=round(x3_12th_1)
x3_12th_rounded=x3_12th_2/1000

disp("TWELFTH ITERATION")
disp("x1: "+string(x1_12th_rounded)+"")
disp("x2: "+string(x2_12th_rounded)+"")
disp("x3: "+string(x3_12th_rounded)+"")

if x1_12th_rounded==x1_11th_rounded & x2_12th_rounded==x2_11th_rounded &
x3_12th_rounded==x3_11th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_12th_rounded)+"")
    disp("x2: "+string(x2_12th_rounded)+"")

```

```

disp("x3: "+string(x3_12th_rounded)+"" )
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// THIRTEENTH ITERATION

x1_13th=(c1+(a12*x2_12th_rounded)+(a13*x3_12th_rounded))/a11
x1_13th_1=x1_13th*1000
x1_13th_2=round(x1_13th_1)
x1_13th_rounded=x1_13th_2/1000

x2_13th=(c2+(a21*x1_12th_rounded)+(a23*x3_12th_rounded))/a22
x2_13th_1=x2_13th*1000
x2_13th_2=round(x2_13th_1)
x2_13th_rounded=x2_13th_2/1000

x3_13th=(c3+(a31*x1_12th_rounded)+(a32*x2_12th_rounded))/a33
x3_13th_1=x3_13th*1000
x3_13th_2=round(x3_13th_1)
x3_13th_rounded=x3_13th_2/1000

disp("THIRTEENTH ITERATION")
disp("x1: "+string(x1_13th_rounded)+"" )
disp("x2: "+string(x2_13th_rounded)+"" )
disp("x3: "+string(x3_13th_rounded)+"" )

if x1_13th_rounded==x1_12th_rounded & x2_13th_rounded==x2_12th_rounded &
x3_13th_rounded==x3_12th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_13th_rounded)+"" )
    disp("x2: "+string(x2_13th_rounded)+"" )
    disp("x3: "+string(x3_13th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
    end
end

```

```

        abort
    end
end

// FOURTEENTH ITERATION

x1_14th=(c1+(a12*x2_13th_rounded)+(a13*x3_13th_rounded))/a11
x1_14th_1=x1_14th*1000
x1_14th_2=round(x1_14th_1)
x1_14th_rounded=x1_14th_2/1000

x2_14th=(c2+(a21*x1_13th_rounded)+(a23*x3_13th_rounded))/a22
x2_14th_1=x2_14th*1000
x2_14th_2=round(x2_14th_1)
x2_14th_rounded=x2_14th_2/1000

x3_14th=(c3+(a31*x1_13th_rounded)+(a32*x2_13th_rounded))/a33
x3_14th_1=x3_14th*1000
x3_14th_2=round(x3_14th_1)
x3_14th_rounded=x3_14th_2/1000

disp("FOURTEENTH ITERATION")
disp("x1: "+string(x1_14th_rounded)+"")
disp("x2: "+string(x2_14th_rounded)+"")
disp("x3: "+string(x3_14th_rounded)+"")

if x1_14th_rounded==x1_13th_rounded & x2_14th_rounded==x2_13th_rounded &
x3_14th_rounded==x3_13th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_14th_rounded)+"")
    disp("x2: "+string(x2_14th_rounded)+"")
    disp("x3: "+string(x3_14th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FIFTEENTH ITERATION

x1_15th=(c1+(a12*x2_14th_rounded)+(a13*x3_14th_rounded))/a11
x1_15th_1=x1_15th*1000
x1_15th_2=round(x1_15th_1)
x1_15th_rounded=x1_15th_2/1000

x2_15th=(c2+(a21*x1_14th_rounded)+(a23*x3_14th_rounded))/a22

```



```

x2_15th_1=x2_15th*1000
x2_15th_2=round(x2_15th_1)
x2_15th_rounded=x2_15th_2/1000

x3_15th=(c3+(a31*x1_14th_rounded)+(a32*x2_14th_rounded))/a33
x3_15th_1=x3_15th*1000
x3_15th_2=round(x3_15th_1)
x3_15th_rounded=x3_15th_2/1000

disp("FIFTEENTH ITERATION")
disp("x1: "+string(x1_15th_rounded)+""")
disp("x2: "+string(x2_15th_rounded)+""")
disp("x3: "+string(x3_15th_rounded)+""")

if x1_15th_rounded==x1_14th_rounded & x2_15th_rounded==x2_14th_rounded &
x3_15th_rounded==x3_14th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_15th_rounded)+""")
    disp("x2: "+string(x2_15th_rounded)+""")
    disp("x3: "+string(x3_15th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SIXTEENTH ITERATION

x1_16th=(c1+(a12*x2_15th_rounded)+(a13*x3_15th_rounded))/a11
x1_16th_1=x1_16th*1000
x1_16th_2=round(x1_16th_1)
x1_16th_rounded=x1_16th_2/1000

x2_16th=(c2+(a21*x1_15th_rounded)+(a23*x3_15th_rounded))/a22
x2_16th_1=x2_16th*1000
x2_16th_2=round(x2_16th_1)
x2_16th_rounded=x2_16th_2/1000

x3_16th=(c3+(a31*x1_15th_rounded)+(a32*x2_15th_rounded))/a33
x3_16th_1=x3_16th*1000
x3_16th_2=round(x3_16th_1)
x3_16th_rounded=x3_16th_2/1000

disp("SIXTEENTH ITERATION")
disp("x1: "+string(x1_16th_rounded)+""")
disp("x2: "+string(x2_16th_rounded)+""")

```

```

disp("x3: "+string(x3_16th_rounded)+""")

if x1_16th_rounded==x1_15th_rounded & x2_16th_rounded==x2_15th_rounded &
x3_16th_rounded==x3_15th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_16th_rounded)+""")
    disp("x2: "+string(x2_16th_rounded)+""")
    disp("x3: "+string(x3_16th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SEVENTEENTH ITERATION

x1_17th=(c1+(a12*x2_16th_rounded)+(a13*x3_16th_rounded))/a11
x1_17th_1=x1_17th*1000
x1_17th_2=round(x1_17th_1)
x1_17th_rounded=x1_17th_2/1000

x2_17th=(c2+(a21*x1_16th_rounded)+(a23*x3_16th_rounded))/a22
x2_17th_1=x2_17th*1000
x2_17th_2=round(x2_17th_1)
x2_17th_rounded=x2_17th_2/1000

x3_17th=(c3+(a31*x1_16th_rounded)+(a32*x2_16th_rounded))/a33
x3_17th_1=x3_17th*1000
x3_17th_2=round(x3_17th_1)
x3_17th_rounded=x3_17th_2/1000

disp("SEVENTEENTH ITERATION")
disp("x1: "+string(x1_17th_rounded)+""")
disp("x2: "+string(x2_17th_rounded)+""")
disp("x3: "+string(x3_17th_rounded)+""")

if x1_17th_rounded==x1_16th_rounded & x2_17th_rounded==x2_16th_rounded &
x3_17th_rounded==x3_16th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_17th_rounded)+""")
    disp("x2: "+string(x2_17th_rounded)+""")
    disp("x3: "+string(x3_17th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")

```

```

ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// EIGHTEENTH ITERATION

x1_18th=(c1+(a12*x2_17th_rounded)+(a13*x3_17th_rounded))/a11
x1_18th_1=x1_18th*1000
x1_18th_2=round(x1_18th_1)
x1_18th_rounded=x1_18th_2/1000

x2_18th=(c2+(a21*x1_17th_rounded)+(a23*x3_17th_rounded))/a22
x2_18th_1=x2_18th*1000
x2_18th_2=round(x2_18th_1)
x2_18th_rounded=x2_18th_2/1000

x3_18th=(c3+(a31*x1_17th_rounded)+(a32*x2_17th_rounded))/a33
x3_18th_1=x3_18th*1000
x3_18th_2=round(x3_18th_1)
x3_18th_rounded=x3_18th_2/1000

disp("EIGHTEENTH ITERATION")
disp("x1: "+string(x1_18th_rounded)+""")
disp("x2: "+string(x2_18th_rounded)+""")
disp("x3: "+string(x3_18th_rounded)+""")

if x1_18th_rounded==x1_17th_rounded & x2_18th_rounded==x2_17th_rounded &
x3_18th_rounded==x3_17th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_18th_rounded)+""")
    disp("x2: "+string(x2_18th_rounded)+""")
    disp("x3: "+string(x3_18th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end
end

```

// NINETEENTH ITERATION

```
x1_19th=(c1+(a12*x2_18th_rounded)+(a13*x3_18th_rounded))/a11
x1_19th_1=x1_19th*1000
x1_19th_2=round(x1_19th_1)
x1_19th_rounded=x1_19th_2/1000
```

```
x2_19th=(c2+(a21*x1_18th_rounded)+(a23*x3_18th_rounded))/a22
x2_19th_1=x2_19th*1000
x2_19th_2=round(x2_19th_1)
x2_19th_rounded=x2_19th_2/1000
```

```
x3_19th=(c3+(a31*x1_18th_rounded)+(a32*x2_18th_rounded))/a33
x3_19th_1=x3_19th*1000
x3_19th_2=round(x3_19th_1)
x3_19th_rounded=x3_19th_2/1000
```

```
disp("NINETEENTH ITERATION")
disp("x1: "+string(x1_19th_rounded)+"")
disp("x2: "+string(x2_19th_rounded)+"")
disp("x3: "+string(x3_19th_rounded)+"")
```

```
if x1_19th_rounded==x1_18th_rounded & x2_19th_rounded==x2_18th_rounded &
x3_19th_rounded==x3_18th_rounded then
```

```
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_19th_rounded)+"")
    disp("x2: "+string(x2_19th_rounded)+"")
    disp("x3: "+string(x3_19th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end
```

// TWENTIETH ITERATION

```
x1_20th=(c1+(a12*x2_19th_rounded)+(a13*x3_19th_rounded))/a11
x1_20th_1=x1_20th*1000
x1_20th_2=round(x1_20th_1)
x1_20th_rounded=x1_20th_2/1000
```

```
x2_20th=(c2+(a21*x1_19th_rounded)+(a23*x3_19th_rounded))/a22
x2_20th_1=x2_20th*1000
x2_20th_2=round(x2_20th_1)
x2_20th_rounded=x2_20th_2/1000
```

```

x3_20th=(c3+(a31*x1_19th_rounded)+(a32*x2_19th_rounded))/a33
x3_20th_1=x3_20th*1000
x3_20th_2=round(x3_20th_1)
x3_20th_rounded=x3_20th_2/1000

disp("TWENTIETH ITERATION")
disp("x1: "+string(x1_20th_rounded)+""")
disp("x2: "+string(x2_20th_rounded)+""")
disp("x3: "+string(x3_20th_rounded)+""")

if x1_20th_rounded==x1_19th_rounded & x2_20th_rounded==x2_19th_rounded &
x3_20th_rounded==x3_19th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_20th_rounded)+""")
    disp("x2: "+string(x2_20th_rounded)+""")
    disp("x3: "+string(x3_20th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-FIRST ITERATION

x1_21st=(c1+(a12*x2_20th_rounded)+(a13*x3_20th_rounded))/a11
x1_21st_1=x1_21st*1000
x1_21st_2=round(x1_21st_1)
x1_21st_rounded=x1_21st_2/1000

x2_21st=(c2+(a21*x1_20th_rounded)+(a23*x3_20th_rounded))/a22
x2_21st_1=x2_21st*1000
x2_21st_2=round(x2_21st_1)
x2_21st_rounded=x2_21st_2/1000

x3_21st=(c3+(a31*x1_20th_rounded)+(a32*x2_20th_rounded))/a33
x3_21st_1=x3_21st*1000
x3_21st_2=round(x3_21st_1)
x3_21st_rounded=x3_21st_2/1000

disp("TWENTY-FIRST ITERATION")
disp("x1: "+string(x1_21st_rounded)+""")
disp("x2: "+string(x2_21st_rounded)+""")
disp("x3: "+string(x3_21st_rounded)+""")

if x1_21st_rounded==x1_20th_rounded & x2_21st_rounded==x2_20th_rounded &
x3_21st_rounded==x3_20th_rounded then

```

```

disp("")
disp("CONDITION MET: Two successive approximations are identical.")
disp("x1: "+string(x1_21st_rounded)+"")
disp("x2: "+string(x2_21st_rounded)+"")
disp("x3: "+string(x3_21st_rounded)+"")
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// TWENTY-SECOND ITERATION

x1_22nd=(c1+(a12*x2_21st_rounded)+(a13*x3_21st_rounded))/a11
x1_22nd_1=x1_22nd*1000
x1_22nd_2=round(x1_22nd_1)
x1_22nd_rounded=x1_22nd_2/1000

x2_22nd=(c2+(a21*x1_21st_rounded)+(a23*x3_21st_rounded))/a22
x2_22nd_1=x2_22nd*1000
x2_22nd_2=round(x2_22nd_1)
x2_22nd_rounded=x2_22nd_2/1000

x3_22nd=(c3+(a31*x1_21st_rounded)+(a32*x2_21st_rounded))/a33
x3_22nd_1=x3_22nd*1000
x3_22nd_2=round(x3_22nd_1)
x3_22nd_rounded=x3_22nd_2/1000

disp("TWENTY-SECOND ITERATION")
disp("x1: "+string(x1_22nd_rounded)+"")
disp("x2: "+string(x2_22nd_rounded)+"")
disp("x3: "+string(x3_22nd_rounded)+"")

if x1_22nd_rounded==x1_21st_rounded & x2_22nd_rounded==x2_21st_rounded &
x3_22nd_rounded==x3_21st_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_22nd_rounded)+"")
    disp("x2: "+string(x2_22nd_rounded)+"")
    disp("x3: "+string(x3_22nd_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then

```

```

        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-THIRD ITERATION

x1_23rd=(c1+(a12*x2_22nd_rounded)+(a13*x3_22nd_rounded))/a11
x1_23rd_1=x1_23rd*1000
x1_23rd_2=round(x1_23rd_1)
x1_23rd_rounded=x1_23rd_2/1000

x2_23rd=(c2+(a21*x1_22nd_rounded)+(a23*x3_22nd_rounded))/a22
x2_23rd_1=x2_23rd*1000
x2_23rd_2=round(x2_23rd_1)
x2_23rd_rounded=x2_23rd_2/1000

x3_23rd=(c3+(a31*x1_22nd_rounded)+(a32*x2_22nd_rounded))/a33
x3_23rd_1=x3_23rd*1000
x3_23rd_2=round(x3_23rd_1)
x3_23rd_rounded=x3_23rd_2/1000

disp("TWENTY-THIRD ITERATION")
disp("x1: "+string(x1_23rd_rounded)+""")
disp("x2: "+string(x2_23rd_rounded)+""")
disp("x3: "+string(x3_23rd_rounded)+""")

if x1_23rd_rounded==x1_22nd_rounded & x2_23rd_rounded==x2_22nd_rounded &
x3_23rd_rounded==x3_22nd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_23rd_rounded)+""")
    disp("x2: "+string(x2_23rd_rounded)+""")
    disp("x3: "+string(x3_23rd_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-FOURTH ITERATION

x1_24th=(c1+(a12*x2_23rd_rounded)+(a13*x3_23rd_rounded))/a11
x1_24th_1=x1_24th*1000

```

```

x1_24th_2=round(x1_24th_1)
x1_24th_rounded=x1_24th_2/1000

x2_24th=(c2+(a21*x1_23rd_rounded)+(a23*x3_23rd_rounded))/a22
x2_24th_1=x2_24th*1000
x2_24th_2=round(x2_24th_1)
x2_24th_rounded=x2_24th_2/1000

x3_24th=(c3+(a31*x1_23rd_rounded)+(a32*x2_23rd_rounded))/a33
x3_24th_1=x3_24th*1000
x3_24th_2=round(x3_24th_1)
x3_24th_rounded=x3_24th_2/1000

disp("TWENTY-FOURTH ITERATION")
disp("x1: "+string(x1_24th_rounded)+"")
disp("x2: "+string(x2_24th_rounded)+"")
disp("x3: "+string(x3_24th_rounded)+"")

if x1_24th_rounded==x1_23rd_rounded & x2_24th_rounded==x2_23rd_rounded &
x3_24th_rounded==x3_23rd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_24th_rounded)+"")
    disp("x2: "+string(x2_24th_rounded)+"")
    disp("x3: "+string(x3_24th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-FIFTH ITERATION

x1_25th=(c1+(a12*x2_24th_rounded)+(a13*x3_24th_rounded))/a11
x1_25th_1=x1_25th*1000
x1_25th_2=round(x1_25th_1)
x1_25th_rounded=x1_25th_2/1000

x2_25th=(c2+(a21*x1_24th_rounded)+(a23*x3_24th_rounded))/a22
x2_25th_1=x2_25th*1000
x2_25th_2=round(x2_25th_1)
x2_25th_rounded=x2_25th_2/1000

x3_25th=(c3+(a31*x1_24th_rounded)+(a32*x2_24th_rounded))/a33
x3_25th_1=x3_25th*1000
x3_25th_2=round(x3_25th_1)
x3_25th_rounded=x3_25th_2/1000

```



```

disp("TWENTY-FIFTH ITERATION")
disp("x1: "+string(x1_25th_rounded)+"")
disp("x2: "+string(x2_25th_rounded)+"")
disp("x3: "+string(x3_25th_rounded)+"")

if x1_25th_rounded==x1_24th_rounded & x2_25th_rounded==x2_24th_rounded &
x3_25th_rounded==x3_24th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_25th_rounded)+"")
    disp("x2: "+string(x2_25th_rounded)+"")
    disp("x3: "+string(x3_25th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// CONDITION: MUST BE STRICTLY DIAGONALLY DOMINANT

elseif x1_divergence_final_checking>x1_divergence_initial_checking &
x2_divergence_final_checking>x2_divergence_initial_checking &
x3_divergence_final_checking>x3_divergence_initial_checking then
    disp("")
    disp("ERROR: Divergences of approximations are occurring! This may be because of the matrix
provided, which may not be strictly diagonally dominant!")
    disp("RECOMMENDED ACTION: Interchange the rows inside your matrix such that the matrix is
strictly diagonally dominant.")
    disp("IMPORTANT NOTE: This conditional error may not always be the case. Although it is important
to take note of that Jacobi Method always CONVERGES.")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end
else
    disp("")
    disp("ERROR: EXCEEDED THE APPROXIMATING CAPABILITIES OF THE PROGRAM!")

```

```

        disp("RECOMMENDED ACTION: Switch to Gauss-Seidel Method. You can also wait for the next
update of this program.")
        disp("For any inquiries, please contact Head Developer through email: bernardoraevon@gmail.com")
        disp("")
        disp("Restart the program? Input Yes to restart and No to abort.")
        disp("")
        ANSWER_RESTART=input (" Your Choice: ")
        if ANSWER_RESTART==1 then
            continue
        elseif ANSWER_RESTART==0 then
            clc
            disp("Thank you for using our program!")
            disp("For any inquiries, please contact Head Developer through this email:")
            disp("bernardoraevon@gmail.com")
            abort
        end
    end
end
elseif ANSWER1==321 then
    clc
    a=123
    b=213
    A=123
    B=213
    disp("Program Mode: Gauss-Seidel Method")
    disp("What are the parameters of your system/matrix?")
    disp("(a) 2x2")
    disp("(b) 3x3")
    disp("")
    ANSWER2=input (" Your choice: ")
    if ANSWER2==123 then
        clc

        // 2X2 MATRIX GAUSS-SEIDEL METHOD
        // INPUT REQUIRED VALUES

        disp("Program Mode: Gauss-Seidel Method")
        disp("System/Matrix Size: 2x2")
        disp("Instructions: Please input the values of your matrix.")
        disp("")
        disp("First Equation")
        disp("")
        a11=input (" Please input a11: ")
        a12=input (" Please input a12: ")
        c1=input (" Please input c1: ")
        if a11<0 then
            a11=a11*-1
            c1=c1*-1
        elseif a11>0 then
            a12=a12*-1
        end
        disp("Second Equation")
        disp("")
        a21=input (" Please input a21: ")
        a22=input (" Please input a22: ")
        c2=input (" Please input c2: ")
    end
end
end

```

```

if a22<0 then
    a22=a22*-1
    c2=c2*-1
elseif a22>0 then
    a21=a21*-1
end

// FIRST ITERATION

x1_1st=c1/a11
x1_1st_1=x1_1st*1000
x1_1st_2=round(x1_1st_1)
x1_1st_rounded=x1_1st_2/1000

x2_1st=(c2+(a21*x1_1st_rounded))/a22
x2_1st_1=x2_1st*1000
x2_1st_2=round(x2_1st_1)
x2_1st_rounded=x2_1st_2/1000

disp("FIRST ITERATION")
disp("x1: "+string(x1_1st_rounded)+"" )
disp("x2: "+string(x2_1st_rounded)+"" )

// SECOND ITERATION

x1_2nd=(c1+(a12*x2_1st_rounded))/a11
x1_2nd_1=x1_2nd*1000
x1_2nd_2=round(x1_2nd_1)
x1_2nd_rounded=x1_2nd_2/1000

x2_2nd=(c2+(a21*x1_2nd_rounded))/a22
x2_2nd_1=x2_2nd*1000
x2_2nd_2=round(x2_2nd_1)
x2_2nd_rounded=x2_2nd_2/1000

disp("SECOND ITERATION")
disp("x1: "+string(x1_2nd_rounded)+"" )
disp("x2: "+string(x2_2nd_rounded)+"" )

if x1_2nd_rounded==x1_1st_rounded & x2_2nd_rounded==x2_1st_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_2nd_rounded)+"" )
    disp("x2: "+string(x2_2nd_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

```

    end
end

// THIRD ITERATION

x1_3rd=(c1+(a12*x2_2nd_rounded))/a11
x1_3rd_1=x1_3rd*1000
x1_3rd_2=round(x1_3rd_1)
x1_3rd_rounded=x1_3rd_2/1000

x2_3rd=(c2+(a21*x1_3rd_rounded))/a22
x2_3rd_1=x2_3rd*1000
x2_3rd_2=round(x2_3rd_1)
x2_3rd_rounded=x2_3rd_2/1000

disp("THIRD ITERATION")
disp("x1: "+string(x1_3rd_rounded)+"" )
disp("x2: "+string(x2_3rd_rounded)+"" )

if x1_3rd_rounded==x1_2nd_rounded & x2_3rd_rounded==x2_2nd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_3rd_rounded)+"" )
    disp("x2: "+string(x2_3rd_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FOURTH ITERATION

x1_4th=(c1+(a12*x2_3rd_rounded))/a11
x1_4th_1=x1_4th*1000
x1_4th_2=round(x1_4th_1)
x1_4th_rounded=x1_4th_2/1000

x2_4th=(c2+(a21*x1_4th_rounded))/a22
x2_4th_1=x2_4th*1000
x2_4th_2=round(x2_4th_1)
x2_4th_rounded=x2_4th_2/1000

disp("FOURTH ITERATION")
disp("x1: "+string(x1_4th_rounded)+"" )
disp("x2: "+string(x2_4th_rounded)+"" )

if x1_4th_rounded==x1_3rd_rounded & x2_4th_rounded==x2_3rd_rounded then

```

```

disp("")
disp("CONDITION MET: Two successive approximations are identical.")
disp("x1: "+string(x1_4th_rounded)+"")
disp("x2: "+string(x2_4th_rounded)+"")
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

x1_3rd_rounded_absolute=abs(x1_3rd_rounded)
x2_3rd_rounded_absolute=abs(x2_3rd_rounded)
x1_4th_rounded_absolute=abs(x1_4th_rounded)
x2_4th_rounded_absolute=abs(x2_4th_rounded)
x1_divergence_initial_checking=(x1_4th_rounded_absolute+x1_3rd_rounded_absolute)/2
x2_divergence_initial_checking=(x2_4th_rounded_absolute+x2_3rd_rounded_absolute)/2

// FIFTH ITERATION

x1_5th=(c1+(a12*x2_4th_rounded))/a11
x1_5th_1=x1_5th*1000
x1_5th_2=round(x1_5th_1)
x1_5th_rounded=x1_5th_2/1000

x2_5th=(c2+(a21*x1_5th_rounded))/a22
x2_5th_1=x2_5th*1000
x2_5th_2=round(x2_5th_1)
x2_5th_rounded=x2_5th_2/1000

disp("FIFTH ITERATION")
disp("x1: "+string(x1_5th_rounded)+"")
disp("x2: "+string(x2_5th_rounded)+"")

if x1_5th_rounded==x1_4th_rounded & x2_5th_rounded==x2_4th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_5th_rounded)+"")
    disp("x2: "+string(x2_5th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
    end
end

```

```

        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

x1_5th_rounded_absolute=abs(x1_5th_rounded)
x2_5th_rounded_absolute=abs(x2_5th_rounded)
x1_divergence_final_checking=(x1_5th_rounded_absolute+x1_4th_rounded_absolute)/2
x2_divergence_final_checking=(x2_5th_rounded_absolute+x2_4th_rounded_absolute)/2

// SIXTH ITERATION

x1_6th=(c1+(a12*x2_5th_rounded))/a11
x1_6th_1=x1_6th*1000
x1_6th_2=round(x1_6th_1)
x1_6th_rounded=x1_6th_2/1000

x2_6th=(c2+(a21*x1_6th_rounded))/a22
x2_6th_1=x2_6th*1000
x2_6th_2=round(x2_6th_1)
x2_6th_rounded=x2_6th_2/1000

disp("SIXTH ITERATION")
disp("x1: "+string(x1_6th_rounded)+"")
disp("x2: "+string(x2_6th_rounded)+"")

if x1_6th_rounded==x1_5th_rounded & x2_6th_rounded==x2_5th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_6th_rounded)+"")
    disp("x2: "+string(x2_6th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SEVENTH ITERATION

x1_7th=(c1+(a12*x2_6th_rounded))/a11
x1_7th_1=x1_7th*1000
x1_7th_2=round(x1_7th_1)
x1_7th_rounded=x1_7th_2/1000

x2_7th=(c2+(a21*x1_7th_rounded))/a22
x2_7th_1=x2_7th*1000

```

```

x2_7th_2=round(x2_7th_1)
x2_7th_rounded=x2_7th_2/1000

disp("SEVENTH ITERATION")
disp("x1: "+string(x1_7th_rounded)+""")
disp("x2: "+string(x2_7th_rounded)+""")

if x1_7th_rounded==x1_6th_rounded & x2_7th_rounded==x2_6th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_7th_rounded)+""")
    disp("x2: "+string(x2_7th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// EIGHTH ITERATION

x1_8th=(c1+(a12*x2_7th_rounded))/a11
x1_8th_1=x1_8th*1000
x1_8th_2=round(x1_8th_1)
x1_8th_rounded=x1_8th_2/1000

x2_8th=(c2+(a21*x1_8th_rounded))/a22
x2_8th_1=x2_8th*1000
x2_8th_2=round(x2_8th_1)
x2_8th_rounded=x2_8th_2/1000

disp("EIGHTH ITERATION")
disp("x1: "+string(x1_8th_rounded)+""")
disp("x2: "+string(x2_8th_rounded)+""")

if x1_8th_rounded==x1_7th_rounded & x2_8th_rounded==x2_7th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_8th_rounded)+""")
    disp("x2: "+string(x2_8th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc

```

```

        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

// NINTH ITERATION

```

x1_9th=(c1+(a12*x2_8th_rounded))/a11
x1_9th_1=x1_9th*1000
x1_9th_2=round(x1_9th_1)
x1_9th_rounded=x1_9th_2/1000

```

```

x2_9th=(c2+(a21*x1_9th_rounded))/a22
x2_9th_1=x2_9th*1000
x2_9th_2=round(x2_9th_1)
x2_9th_rounded=x2_9th_2/1000

```

```

disp("NINTH ITERATION")
disp("x1: "+string(x1_9th_rounded)+"")
disp("x2: "+string(x2_9th_rounded)+"")

```

```

if x1_9th_rounded==x1_8th_rounded & x2_9th_rounded==x2_8th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_9th_rounded)+"")
    disp("x2: "+string(x2_9th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

// TENTH ITERATION

```

x1_10th=(c1+(a12*x2_9th_rounded))/a11
x1_10th_1=x1_10th*1000
x1_10th_2=round(x1_10th_1)
x1_10th_rounded=x1_10th_2/1000

```

```

x2_10th=(c2+(a21*x1_10th_rounded))/a22
x2_10th_1=x2_10th*1000
x2_10th_2=round(x2_10th_1)
x2_10th_rounded=x2_10th_2/1000

```

```

disp("TENTH ITERATION")

```



```

disp("x1: "+string(x1_10th_rounded)+"" )
disp("x2: "+string(x2_10th_rounded)+"" )

if x1_10th_rounded==x1_9th_rounded & x2_10th_rounded==x2_9th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_10th_rounded)+"" )
    disp("x2: "+string(x2_10th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// ELEVENTH ITERATION

x1_11th=(c1+(a12*x2_10th_rounded))/a11
x1_11th_1=x1_11th*1000
x1_11th_2=round(x1_11th_1)
x1_11th_rounded=x1_11th_2/1000

x2_11th=(c2+(a21*x1_11th_rounded))/a22
x2_11th_1=x2_11th*1000
x2_11th_2=round(x2_11th_1)
x2_11th_rounded=x2_11th_2/1000

disp("ELEVENTH ITERATION")
disp("x1: "+string(x1_11th_rounded)+"" )
disp("x2: "+string(x2_11th_rounded)+"" )

if x1_11th_rounded==x1_10th_rounded & x2_11th_rounded==x2_10th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_11th_rounded)+"" )
    disp("x2: "+string(x2_11th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

```

    end
end

// TWELFTH ITERATION

x1_12th=(c1+(a12*x2_11th_rounded))/a11
x1_12th_1=x1_12th*1000
x1_12th_2=round(x1_12th_1)
x1_12th_rounded=x1_12th_2/1000

x2_12th=(c2+(a21*x1_12th_rounded))/a22
x2_12th_1=x2_12th*1000
x2_12th_2=round(x2_12th_1)
x2_12th_rounded=x2_12th_2/1000

disp("TWELFTH ITERATION")
disp("x1: "+string(x1_12th_rounded)+""")
disp("x2: "+string(x2_12th_rounded)+""")

if x1_12th_rounded==x1_11th_rounded & x2_12th_rounded==x2_11th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_12th_rounded)+""")
    disp("x2: "+string(x2_12th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// THIRTEENTH ITERATION

x1_13th=(c1+(a12*x2_12th_rounded))/a11
x1_13th_1=x1_13th*1000
x1_13th_2=round(x1_13th_1)
x1_13th_rounded=x1_13th_2/1000

x2_13th=(c2+(a21*x1_13th_rounded))/a22
x2_13th_1=x2_13th*1000
x2_13th_2=round(x2_13th_1)
x2_13th_rounded=x2_13th_2/1000

disp("THIRTEENTH ITERATION")
disp("x1: "+string(x1_13th_rounded)+""")
disp("x2: "+string(x2_13th_rounded)+""")

if x1_13th_rounded==x1_12th_rounded & x2_13th_rounded==x2_12th_rounded then

```

```

disp("")
disp("CONDITION MET: Two successive approximations are identical.")
disp("x1: "+string(x1_13th_rounded)+"")
disp("x2: "+string(x2_13th_rounded)+"")
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// FOURTEENTH ITERATION

x1_14th=(c1+(a12*x2_13th_rounded))/a11
x1_14th_1=x1_14th*1000
x1_14th_2=round(x1_14th_1)
x1_14th_rounded=x1_14th_2/1000

x2_14th=(c2+(a21*x1_14th_rounded))/a22
x2_14th_1=x2_14th*1000
x2_14th_2=round(x2_14th_1)
x2_14th_rounded=x2_14th_2/1000

disp("FOURTEENTH ITERATION")
disp("x1: "+string(x1_14th_rounded)+"")
disp("x2: "+string(x2_14th_rounded)+"")

if x1_14th_rounded==x1_13th_rounded & x2_14th_rounded==x2_13th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_14th_rounded)+"")
    disp("x2: "+string(x2_14th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FIFTEENTH ITERATION

```

```

x1_15th=(c1+(a12*x2_14th_rounded))/a11
x1_15th_1=x1_15th*1000
x1_15th_2=round(x1_15th_1)
x1_15th_rounded=x1_15th_2/1000

x2_15th=(c2+(a21*x1_15th_rounded))/a22
x2_15th_1=x2_15th*1000
x2_15th_2=round(x2_15th_1)
x2_15th_rounded=x2_15th_2/1000

disp("FIFTEENTH ITERATION")
disp("x1: "+string(x1_15th_rounded)+"" )
disp("x2: "+string(x2_15th_rounded)+"" )

if x1_15th_rounded==x1_14th_rounded & x2_15th_rounded==x2_14th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_15th_rounded)+"" )
    disp("x2: "+string(x2_15th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SIXTEENTH ITERATION

x1_16th=(c1+(a12*x2_15th_rounded))/a11
x1_16th_1=x1_16th*1000
x1_16th_2=round(x1_16th_1)
x1_16th_rounded=x1_16th_2/1000

x2_16th=(c2+(a21*x1_16th_rounded))/a22
x2_16th_1=x2_16th*1000
x2_16th_2=round(x2_16th_1)
x2_16th_rounded=x2_16th_2/1000

disp("SIXTEENTH ITERATION")
disp("x1: "+string(x1_16th_rounded)+"" )
disp("x2: "+string(x2_16th_rounded)+"" )

if x1_16th_rounded==x1_15th_rounded & x2_16th_rounded==x2_15th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_16th_rounded)+"" )
    disp("x2: "+string(x2_16th_rounded)+"" )

```

```

disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// SEVENTEENTH ITERATION

x1_17th=(c1+(a12*x2_16th_rounded))/a11
x1_17th_1=x1_17th*1000
x1_17th_2=round(x1_17th_1)
x1_17th_rounded=x1_17th_2/1000

x2_17th=(c2+(a21*x1_17th_rounded))/a22
x2_17th_1=x2_17th*1000
x2_17th_2=round(x2_17th_1)
x2_17th_rounded=x2_17th_2/1000

disp("SEVENTEENTH ITERATION")
disp("x1: "+string(x1_17th_rounded)+""")
disp("x2: "+string(x2_17th_rounded)+""")

if x1_17th_rounded==x1_16th_rounded & x2_17th_rounded==x2_16th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_17th_rounded)+""")
    disp("x2: "+string(x2_17th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// EIGHTEENTH ITERATION

x1_18th=(c1+(a12*x2_17th_rounded))/a11
x1_18th_1=x1_18th*1000
x1_18th_2=round(x1_18th_1)

```

```

x1_18th_rounded=x1_18th_2/1000

x2_18th=(c2+(a21*x1_18th_rounded))/a22
x2_18th_1=x2_18th*1000
x2_18th_2=round(x2_18th_1)
x2_18th_rounded=x2_18th_2/1000

disp("EIGHTEENTH ITERATION")
disp("x1: "+string(x1_18th_rounded)+""")
disp("x2: "+string(x2_18th_rounded)+""")

if x1_18th_rounded==x1_17th_rounded & x2_18th_rounded==x2_17th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_18th_rounded)+""")
    disp("x2: "+string(x2_18th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// NINETEENTH ITERATION

x1_19th=(c1+(a12*x2_18th_rounded))/a11
x1_19th_1=x1_19th*1000
x1_19th_2=round(x1_19th_1)
x1_19th_rounded=x1_19th_2/1000

x2_19th=(c2+(a21*x1_19th_rounded))/a22
x2_19th_1=x2_19th*1000
x2_19th_2=round(x2_19th_1)
x2_19th_rounded=x2_19th_2/1000

disp("NINETEENTH ITERATION")
disp("x1: "+string(x1_19th_rounded)+""")
disp("x2: "+string(x2_19th_rounded)+""")

if x1_19th_rounded==x1_18th_rounded & x2_19th_rounded==x2_18th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_19th_rounded)+""")
    disp("x2: "+string(x2_19th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")

```

```

    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTIETH ITERATION

x1_20th=(c1+(a12*x2_19th_rounded))/a11
x1_20th_1=x1_20th*1000
x1_20th_2=round(x1_20th_1)
x1_20th_rounded=x1_20th_2/1000

x2_20th=(c2+(a21*x1_20th_rounded))/a22
x2_20th_1=x2_20th*1000
x2_20th_2=round(x2_20th_1)
x2_20th_rounded=x2_20th_2/1000

disp("TWENTIETH ITERATION")
disp("x1: "+string(x1_20th_rounded)+"")
disp("x2: "+string(x2_20th_rounded)+"")

if x1_20th_rounded==x1_19th_rounded & x2_20th_rounded==x2_19th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_20th_rounded)+"")
    disp("x2: "+string(x2_20th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-FIRST ITERATION

x1_21st=(c1+(a12*x2_20th_rounded))/a11
x1_21st_1=x1_21st*1000
x1_21st_2=round(x1_21st_1)
x1_21st_rounded=x1_21st_2/1000

x2_21st=(c2+(a21*x1_21st_rounded))/a22
x2_21st_1=x2_21st*1000

```

```

x2_21st_2=round(x2_21st_1)
x2_21st_rounded=x2_21st_2/1000

disp("TWENTY-FIRST ITERATION")
disp("x1: "+string(x1_21st_rounded)+"")
disp("x2: "+string(x2_21st_rounded)+"")

if x1_21st_rounded==x1_20th_rounded & x2_21st_rounded==x2_20th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_21st_rounded)+"")
    disp("x2: "+string(x2_21st_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-SECOND ITERATION

x1_22nd=(c1+(a12*x2_21st_rounded))/a11
x1_22nd_1=x1_22nd*1000
x1_22nd_2=round(x1_22nd_1)
x1_22nd_rounded=x1_22nd_2/1000

x2_22nd=(c2+(a21*x1_22nd_rounded))/a22
x2_22nd_1=x2_22nd*1000
x2_22nd_2=round(x2_22nd_1)
x2_22nd_rounded=x2_22nd_2/1000

disp("TWENTY-SECOND ITERATION")
disp("x1: "+string(x1_22nd_rounded)+"")
disp("x2: "+string(x2_22nd_rounded)+"")

if x1_22nd_rounded==x1_21st_rounded & x2_22nd_rounded==x2_21st_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_22nd_rounded)+"")
    disp("x2: "+string(x2_22nd_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc

```



```

        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-THIRD ITERATION

x1_23rd=(c1+(a12*x2_22nd_rounded))/a11
x1_23rd_1=x1_23rd*1000
x1_23rd_2=round(x1_23rd_1)
x1_23rd_rounded=x1_23rd_2/1000

x2_23rd=(c2+(a21*x1_23rd_rounded))/a22
x2_23rd_1=x2_23rd*1000
x2_23rd_2=round(x2_23rd_1)
x2_23rd_rounded=x2_23rd_2/1000

disp("TWENTY-THIRD ITERATION")
disp("x1: "+string(x1_23rd_rounded)+"")
disp("x2: "+string(x2_23rd_rounded)+"")

if x1_23rd_rounded==x1_22nd_rounded & x2_23rd_rounded==x2_22nd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_23rd_rounded)+"")
    disp("x2: "+string(x2_23rd_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-FOURTH ITERATION

x1_24th=(c1+(a12*x2_23rd_rounded))/a11
x1_24th_1=x1_24th*1000
x1_24th_2=round(x1_24th_1)
x1_24th_rounded=x1_24th_2/1000

x2_24th=(c2+(a21*x1_24th_rounded))/a22
x2_24th_1=x2_24th*1000
x2_24th_2=round(x2_24th_1)
x2_24th_rounded=x2_24th_2/1000

disp("TWENTY-FOURTH ITERATION")

```

```

disp("x1: "+string(x1_24th_rounded)+"" )
disp("x2: "+string(x2_24th_rounded)+"" )

if x1_24th_rounded==x1_23rd_rounded & x2_24th_rounded==x2_23rd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_24th_rounded)+"" )
    disp("x2: "+string(x2_24th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

// TWENTY-FIFTH ITERATION

```

x1_25th=(c1+(a12*x2_24th_rounded))/a11
x1_25th_1=x1_25th*1000
x1_25th_2=round(x1_25th_1)
x1_25th_rounded=x1_25th_2/1000

```

```

x2_25th=(c2+(a21*x1_25th_rounded))/a22
x2_25th_1=x2_25th*1000
x2_25th_2=round(x2_25th_1)
x2_25th_rounded=x2_25th_2/1000

```

```

disp("TWENTY-FIFTH ITERATION")
disp("x1: "+string(x1_25th_rounded)+"" )
disp("x2: "+string(x2_25th_rounded)+"" )

```

```

if x1_25th_rounded==x1_24th_rounded & x2_25th_rounded==x2_24th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_25th_rounded)+"" )
    disp("x2: "+string(x2_25th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

```

end

// CONDITION: MUST BE STRICTLY DIAGONALLY DOMINANT

elseif x1_divergence_final_checking>x1_divergence_initial_checking &
x2_divergence_final_checking>x2_divergence_initial_checking then
    disp("")
    disp("ERROR: Divergences of approximations are occurring! This may be because of the matrix
provided, which may not be strictly diagonally dominant!")
    disp("RECOMMENDED ACTION: Interchange the rows inside your matrix such that the matrix is
strictly diagonally dominant.")
    disp("IMPORTANT NOTE: This conditional error may not always be the case. Although it is important
to take note of that Jacobi Method always CONVERGES.")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end
else
    disp("")
    disp("ERROR: EXCEEDED THE APPROXIMATING CAPABILITIES OF THE PROGRAM!")
    disp("RECOMMENDED ACTION: Switch to Jacobi Method. You can also wait for the next update of
this program.")
    disp("For any inquiries, please contact Head Developer through email: bernardoraevon@gmail.com")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end
elseif ANSWER2==213 then
    clc

// 3X3 MATRIX GAUSS-SEIDEL METHOD
// INPUT REQUIRED VALUES

disp("Program Mode: Gauss-Seidel Method")
disp("System/Matrix Size: 3x3")
disp("Instructions: Please input the values of your matrix.")
disp("")

```

```

disp("First Equation")
disp("")
a11=input (" Please input a11: ")
a12=input (" Please input a12: ")
a13=input (" Please input a13: ")
c1=input (" Please input c1: ")
if a11<0 then
    a11=a11*-1
    c1=c1*-1
elseif a11>0 then
    a12=a12*-1
    a13=a13*-1
end
disp("Second Equation")
disp("")
a21=input (" Please input a21: ")
a22=input (" Please input a22: ")
a23=input (" Please input a23: ")
c2=input (" Please input c2: ")
if a22<0 then
    a22=a22*-1
    c2=c2*-1
elseif a22>0 then
    a21=a21*-1
    a23=a23*-1
end
disp("Third Equation")
disp("")
a31=input (" Please input a31: ")
a32=input (" Please input a32: ")
a33=input (" Please input a33: ")
c3=input (" Please input c3: ")
if a33<0 then
    a33=a33*-1
    c3=c3*-1
elseif a33>0 then
    a31=a31*-1
    a32=a32*-1
end

// FIRST ITERATION

x1_1st=c1/a11
x1_1st_1=x1_1st*1000
x1_1st_2=round(x1_1st_1)
x1_1st_rounded=x1_1st_2/1000

x2_1st=(c2+(a21*x1_1st_rounded))/a22
x2_1st_1=x2_1st*1000
x2_1st_2=round(x2_1st_1)
x2_1st_rounded=x2_1st_2/1000

x3_1st=(c3+(a31*x1_1st_rounded)+(a32*x2_1st_rounded))/a33
x3_1st_1=x3_1st*1000
x3_1st_2=round(x3_1st_1)
x3_1st_rounded=x3_1st_2/1000

```

```

disp("FIRST ITERATION")
disp("x1: "+string(x1_1st_rounded)+"")
disp("x2: "+string(x2_1st_rounded)+"")
disp("x3: "+string(x3_1st_rounded)+"")

// SECOND ITERATION

x1_2nd=(c1+(a12*x2_1st_rounded)+(a13*x3_1st_rounded))/a11
x1_2nd_1=x1_2nd*1000
x1_2nd_2=round(x1_2nd_1)
x1_2nd_rounded=x1_2nd_2/1000

x2_2nd=(c2+(a21*x1_2nd_rounded)+(a23*x3_1st_rounded))/a22
x2_2nd_1=x2_2nd*1000
x2_2nd_2=round(x2_2nd_1)
x2_2nd_rounded=x2_2nd_2/1000

x3_2nd=(c3+(a31*x1_2nd_rounded)+(a32*x2_2nd_rounded))/a33
x3_2nd_1=x3_2nd*1000
x3_2nd_2=round(x3_2nd_1)
x3_2nd_rounded=x3_2nd_2/1000

disp("SECOND ITERATION")
disp("x1: "+string(x1_2nd_rounded)+"")
disp("x2: "+string(x2_2nd_rounded)+"")
disp("x3: "+string(x3_2nd_rounded)+"")

if x1_2nd_rounded==x1_1st_rounded & x2_2nd_rounded==x2_1st_rounded &
x3_2nd_rounded==x3_1st_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_2nd_rounded)+"")
    disp("x2: "+string(x2_2nd_rounded)+"")
    disp("x3: "+string(x3_2nd_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// THIRD ITERATION

x1_3rd=(c1+(a12*x2_2nd_rounded)+(a13*x3_2nd_rounded))/a11
x1_3rd_1=x1_3rd*1000
x1_3rd_2=round(x1_3rd_1)
x1_3rd_rounded=x1_3rd_2/1000

```

```

x2_3rd=(c2+(a21*x1_3rd_rounded)+(a23*x3_2nd_rounded))/a22
x2_3rd_1=x2_3rd*1000
x2_3rd_2=round(x2_3rd_1)
x2_3rd_rounded=x2_3rd_2/1000

x3_3rd=(c3+(a31*x1_3rd_rounded)+(a32*x2_3rd_rounded))/a33
x3_3rd_1=x3_3rd*1000
x3_3rd_2=round(x3_3rd_1)
x3_3rd_rounded=x3_3rd_2/1000

disp("THIRD ITERATION")
disp("x1: "+string(x1_3rd_rounded)+"" )
disp("x2: "+string(x2_3rd_rounded)+"" )
disp("x3: "+string(x3_3rd_rounded)+"" )

if x1_3rd_rounded==x1_2nd_rounded & x2_3rd_rounded==x2_2nd_rounded &
x3_3rd_rounded==x3_2nd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_3rd_rounded)+"" )
    disp("x2: "+string(x2_3rd_rounded)+"" )
    disp("x3: "+string(x3_3rd_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FOURTH ITERATION

x1_4th=(c1+(a12*x2_3rd_rounded)+(a13*x3_3rd_rounded))/a11
x1_4th_1=x1_4th*1000
x1_4th_2=round(x1_4th_1)
x1_4th_rounded=x1_4th_2/1000

x2_4th=(c2+(a21*x1_4th_rounded)+(a23*x3_3rd_rounded))/a22
x2_4th_1=x2_4th*1000
x2_4th_2=round(x2_4th_1)
x2_4th_rounded=x2_4th_2/1000

x3_4th=(c3+(a31*x1_4th_rounded)+(a32*x2_4th_rounded))/a33
x3_4th_1=x3_4th*1000
x3_4th_2=round(x3_4th_1)
x3_4th_rounded=x3_4th_2/1000

disp("FOURTH ITERATION")

```

```

disp("x1: "+string(x1_4th_rounded)+"")
disp("x2: "+string(x2_4th_rounded)+"")
disp("x3: "+string(x3_4th_rounded)+"")

if x1_4th_rounded==x1_3rd_rounded & x2_4th_rounded==x2_3rd_rounded &
x3_4th_rounded==x3_3rd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_4th_rounded)+"")
    disp("x2: "+string(x2_4th_rounded)+"")
    disp("x3: "+string(x3_4th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

x1_3rd_rounded_absolute=abs(x1_3rd_rounded)
x2_3rd_rounded_absolute=abs(x2_3rd_rounded)
x3_3rd_rounded_absolute=abs(x3_3rd_rounded)
x1_4th_rounded_absolute=abs(x1_4th_rounded)
x2_4th_rounded_absolute=abs(x2_4th_rounded)
x3_4th_rounded_absolute=abs(x3_4th_rounded)
x1_divergence_initial_checking=(x1_4th_rounded_absolute+x1_3rd_rounded_absolute)/2
x2_divergence_initial_checking=(x2_4th_rounded_absolute+x2_3rd_rounded_absolute)/2
x3_divergence_initial_checking=(x3_4th_rounded_absolute+x3_3rd_rounded_absolute)/2

// FIFTH ITERATION

x1_5th=(c1+(a12*x2_4th_rounded)+(a13*x3_4th_rounded))/a11
x1_5th_1=x1_5th*1000
x1_5th_2=round(x1_5th_1)
x1_5th_rounded=x1_5th_2/1000

x2_5th=(c2+(a21*x1_5th_rounded)+(a23*x3_4th_rounded))/a22
x2_5th_1=x2_5th*1000
x2_5th_2=round(x2_5th_1)
x2_5th_rounded=x2_5th_2/1000

x3_5th=(c3+(a31*x1_5th_rounded)+(a32*x2_5th_rounded))/a33
x3_5th_1=x3_5th*1000
x3_5th_2=round(x3_5th_1)
x3_5th_rounded=x3_5th_2/1000

disp("FIFTH ITERATION")
disp("x1: "+string(x1_5th_rounded)+"")
disp("x2: "+string(x2_5th_rounded)+"")

```

```

disp("x3: "+string(x3_5th_rounded)+""))

if x1_5th_rounded==x1_4th_rounded & x2_5th_rounded==x2_4th_rounded &
x3_5th_rounded==x3_4th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_5th_rounded)+""))
    disp("x2: "+string(x2_5th_rounded)+""))
    disp("x3: "+string(x3_5th_rounded)+""))
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

x1_5th_rounded_absolute=abs(x1_5th_rounded)
x2_5th_rounded_absolute=abs(x2_5th_rounded)
x3_5th_rounded_absolute=abs(x3_5th_rounded)
x1_divergence_final_checking=(x1_5th_rounded_absolute+x1_4th_rounded_absolute)/2
x2_divergence_final_checking=(x2_5th_rounded_absolute+x2_4th_rounded_absolute)/2
x3_divergence_final_checking=(x3_5th_rounded_absolute+x3_4th_rounded_absolute)/2

// SIXTH ITERATION

x1_6th=(c1+(a12*x2_5th_rounded)+(a13*x3_5th_rounded))/a11
x1_6th_1=x1_6th*1000
x1_6th_2=round(x1_6th_1)
x1_6th_rounded=x1_6th_2/1000

x2_6th=(c2+(a21*x1_6th_rounded)+(a23*x3_5th_rounded))/a22
x2_6th_1=x2_6th*1000
x2_6th_2=round(x2_6th_1)
x2_6th_rounded=x2_6th_2/1000

x3_6th=(c3+(a31*x1_6th_rounded)+(a32*x2_6th_rounded))/a33
x3_6th_1=x3_6th*1000
x3_6th_2=round(x3_6th_1)
x3_6th_rounded=x3_6th_2/1000

disp("SIXTH ITERATION")
disp("x1: "+string(x1_6th_rounded)+""))
disp("x2: "+string(x2_6th_rounded)+""))
disp("x3: "+string(x3_6th_rounded)+""))

if x1_6th_rounded==x1_5th_rounded & x2_6th_rounded==x2_5th_rounded &
x3_6th_rounded==x3_5th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")

```



```

disp("x1: "+string(x1_6th_rounded)+"")
disp("x2: "+string(x2_6th_rounded)+"")
disp("x3: "+string(x3_6th_rounded)+"")
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

```

// SEVENTH ITERATION

```

x1_7th=(c1+(a12*x2_6th_rounded)+(a13*x3_6th_rounded))/a11
x1_7th_1=x1_7th*1000
x1_7th_2=round(x1_7th_1)
x1_7th_rounded=x1_7th_2/1000

```

```

x2_7th=(c2+(a21*x1_7th_rounded)+(a23*x3_6th_rounded))/a22
x2_7th_1=x2_7th*1000
x2_7th_2=round(x2_7th_1)
x2_7th_rounded=x2_7th_2/1000

```

```

x3_7th=(c3+(a31*x1_7th_rounded)+(a32*x2_7th_rounded))/a33
x3_7th_1=x3_7th*1000
x3_7th_2=round(x3_7th_1)
x3_7th_rounded=x3_7th_2/1000

```

```

disp("SEVENTH ITERATION")
disp("x1: "+string(x1_7th_rounded)+"")
disp("x2: "+string(x2_7th_rounded)+"")
disp("x3: "+string(x3_7th_rounded)+"")

```

```

if x1_7th_rounded==x1_6th_rounded & x2_7th_rounded==x2_6th_rounded &
x3_7th_rounded==x3_6th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_7th_rounded)+"")
    disp("x2: "+string(x2_7th_rounded)+"")
    disp("x3: "+string(x3_7th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
    end
end

```

```

        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// EIGHTH ITERATION

x1_8th=(c1+(a12*x2_7th_rounded)+(a13*x3_7th_rounded))/a11
x1_8th_1=x1_8th*1000
x1_8th_2=round(x1_8th_1)
x1_8th_rounded=x1_8th_2/1000

x2_8th=(c2+(a21*x1_8th_rounded)+(a23*x3_7th_rounded))/a22
x2_8th_1=x2_8th*1000
x2_8th_2=round(x2_8th_1)
x2_8th_rounded=x2_8th_2/1000

x3_8th=(c3+(a31*x1_8th_rounded)+(a32*x2_8th_rounded))/a33
x3_8th_1=x3_8th*1000
x3_8th_2=round(x3_8th_1)
x3_8th_rounded=x3_8th_2/1000

disp("EIGHTH ITERATION")
disp("x1: "+string(x1_8th_rounded)+""")
disp("x2: "+string(x2_8th_rounded)+""")
disp("x3: "+string(x3_8th_rounded)+""")

if x1_8th_rounded==x1_7th_rounded & x2_8th_rounded==x2_7th_rounded &
x3_8th_rounded==x3_7th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_8th_rounded)+""")
    disp("x2: "+string(x2_8th_rounded)+""")
    disp("x3: "+string(x3_8th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// NINTH ITERATION

x1_9th=(c1+(a12*x2_8th_rounded)+(a13*x3_8th_rounded))/a11
x1_9th_1=x1_9th*1000
x1_9th_2=round(x1_9th_1)
x1_9th_rounded=x1_9th_2/1000

```

```

x2_9th=(c2+(a21*x1_9th_rounded)+(a23*x3_8th_rounded))/a22
x2_9th_1=x2_9th*1000
x2_9th_2=round(x2_9th_1)
x2_9th_rounded=x2_9th_2/1000

x3_9th=(c3+(a31*x1_9th_rounded)+(a32*x2_9th_rounded))/a33
x3_9th_1=x3_9th*1000
x3_9th_2=round(x3_9th_1)
x3_9th_rounded=x3_9th_2/1000

disp("NINTH ITERATION")
disp("x1: "+string(x1_9th_rounded)+""")
disp("x2: "+string(x2_9th_rounded)+""")
disp("x3: "+string(x3_9th_rounded)+""")

if x1_9th_rounded==x1_8th_rounded & x2_9th_rounded==x2_8th_rounded &
x3_9th_rounded==x3_8th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_9th_rounded)+""")
    disp("x2: "+string(x2_9th_rounded)+""")
    disp("x3: "+string(x3_9th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TENTH ITERATION

x1_10th=(c1+(a12*x2_9th_rounded)+(a13*x3_9th_rounded))/a11
x1_10th_1=x1_10th*1000
x1_10th_2=round(x1_10th_1)
x1_10th_rounded=x1_10th_2/1000

x2_10th=(c2+(a21*x1_10th_rounded)+(a23*x3_9th_rounded))/a22
x2_10th_1=x2_10th*1000
x2_10th_2=round(x2_10th_1)
x2_10th_rounded=x2_10th_2/1000

x3_10th=(c3+(a31*x1_10th_rounded)+(a32*x2_10th_rounded))/a33
x3_10th_1=x3_10th*1000
x3_10th_2=round(x3_10th_1)
x3_10th_rounded=x3_10th_2/1000

disp("TENTH ITERATION")

```

```

disp("x1: "+string(x1_10th_rounded)+""')
disp("x2: "+string(x2_10th_rounded)+""')
disp("x3: "+string(x3_10th_rounded)+""')

if x1_10th_rounded==x1_9th_rounded & x2_10th_rounded==x2_9th_rounded &
x3_10th_rounded==x3_9th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_10th_rounded)+""')
    disp("x2: "+string(x2_10th_rounded)+""')
    disp("x3: "+string(x3_10th_rounded)+""')
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// ELEVENTH ITERATION

x1_11th=(c1+(a12*x2_10th_rounded)+(a13*x3_10th_rounded))/a11
x1_11th_1=x1_11th*1000
x1_11th_2=round(x1_11th_1)
x1_11th_rounded=x1_11th_2/1000

x2_11th=(c2+(a21*x1_11th_rounded)+(a23*x3_10th_rounded))/a22
x2_11th_1=x2_11th*1000
x2_11th_2=round(x2_11th_1)
x2_11th_rounded=x2_11th_2/1000

x3_11th=(c3+(a31*x1_11th_rounded)+(a32*x2_11th_rounded))/a33
x3_11th_1=x3_11th*1000
x3_11th_2=round(x3_11th_1)
x3_11th_rounded=x3_11th_2/1000

disp("ELEVENTH ITERATION")
disp("x1: "+string(x1_11th_rounded)+""')
disp("x2: "+string(x2_11th_rounded)+""')
disp("x3: "+string(x3_11th_rounded)+""')

if x1_11th_rounded==x1_10th_rounded & x2_11th_rounded==x2_10th_rounded &
x3_11th_rounded==x3_10th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_11th_rounded)+""')
    disp("x2: "+string(x2_11th_rounded)+""')
    disp("x3: "+string(x3_11th_rounded)+""')
    disp("")

```

```

disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

// TWELFTH ITERATION

x1_12th=(c1+(a12*x2_11th_rounded)+(a13*x3_11th_rounded))/a11
x1_12th_1=x1_12th*1000
x1_12th_2=round(x1_12th_1)
x1_12th_rounded=x1_12th_2/1000

x2_12th=(c2+(a21*x1_12th_rounded)+(a23*x3_11th_rounded))/a22
x2_12th_1=x2_12th*1000
x2_12th_2=round(x2_12th_1)
x2_12th_rounded=x2_12th_2/1000

x3_12th=(c3+(a31*x1_12th_rounded)+(a32*x2_12th_rounded))/a33
x3_12th_1=x3_12th*1000
x3_12th_2=round(x3_12th_1)
x3_12th_rounded=x3_12th_2/1000

disp("TWELFTH ITERATION")
disp("x1: "+string(x1_12th_rounded)+"")
disp("x2: "+string(x2_12th_rounded)+"")
disp("x3: "+string(x3_12th_rounded)+"")

if x1_12th_rounded==x1_11th_rounded & x2_12th_rounded==x2_11th_rounded &
x3_12th_rounded==x3_11th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_12th_rounded)+"")
    disp("x2: "+string(x2_12th_rounded)+"")
    disp("x3: "+string(x3_12th_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```

```

end

// THIRTEENTH ITERATION

x1_13th=(c1+(a12*x2_12th_rounded)+(a13*x3_12th_rounded))/a11
x1_13th_1=x1_13th*1000
x1_13th_2=round(x1_13th_1)
x1_13th_rounded=x1_13th_2/1000

x2_13th=(c2+(a21*x1_13th_rounded)+(a23*x3_12th_rounded))/a22
x2_13th_1=x2_13th*1000
x2_13th_2=round(x2_13th_1)
x2_13th_rounded=x2_13th_2/1000

x3_13th=(c3+(a31*x1_13th_rounded)+(a32*x2_13th_rounded))/a33
x3_13th_1=x3_13th*1000
x3_13th_2=round(x3_13th_1)
x3_13th_rounded=x3_13th_2/1000

disp("THIRTEENTH ITERATION")
disp("x1: "+string(x1_13th_rounded)+""")
disp("x2: "+string(x2_13th_rounded)+""")
disp("x3: "+string(x3_13th_rounded)+""")

if x1_13th_rounded==x1_12th_rounded & x2_13th_rounded==x2_12th_rounded &
x3_13th_rounded==x3_12th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_13th_rounded)+""")
    disp("x2: "+string(x2_13th_rounded)+""")
    disp("x3: "+string(x3_13th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FOURTEENTH ITERATION

x1_14th=(c1+(a12*x2_13th_rounded)+(a13*x3_13th_rounded))/a11
x1_14th_1=x1_14th*1000
x1_14th_2=round(x1_14th_1)
x1_14th_rounded=x1_14th_2/1000

x2_14th=(c2+(a21*x1_14th_rounded)+(a23*x3_13th_rounded))/a22
x2_14th_1=x2_14th*1000
x2_14th_2=round(x2_14th_1)

```

```

x2_14th_rounded=x2_14th_2/1000

x3_14th=(c3+(a31*x1_14th_rounded)+(a32*x2_14th_rounded))/a33
x3_14th_1=x3_14th*1000
x3_14th_2=round(x3_14th_1)
x3_14th_rounded=x3_14th_2/1000

disp("FOURTEENTH ITERATION")
disp("x1: "+string(x1_14th_rounded)+""")
disp("x2: "+string(x2_14th_rounded)+""")
disp("x3: "+string(x3_14th_rounded)+""")

if x1_14th_rounded==x1_13th_rounded & x2_14th_rounded==x2_13th_rounded &
x3_14th_rounded==x3_13th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_14th_rounded)+""")
    disp("x2: "+string(x2_14th_rounded)+""")
    disp("x3: "+string(x3_14th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// FIFTEENTH ITERATION

x1_15th=(c1+(a12*x2_14th_rounded)+(a13*x3_14th_rounded))/a11
x1_15th_1=x1_15th*1000
x1_15th_2=round(x1_15th_1)
x1_15th_rounded=x1_15th_2/1000

x2_15th=(c2+(a21*x1_15th_rounded)+(a23*x3_14th_rounded))/a22
x2_15th_1=x2_15th*1000
x2_15th_2=round(x2_15th_1)
x2_15th_rounded=x2_15th_2/1000

x3_15th=(c3+(a31*x1_15th_rounded)+(a32*x2_15th_rounded))/a33
x3_15th_1=x3_15th*1000
x3_15th_2=round(x3_15th_1)
x3_15th_rounded=x3_15th_2/1000

disp("FIFTEENTH ITERATION")
disp("x1: "+string(x1_15th_rounded)+""")
disp("x2: "+string(x2_15th_rounded)+""")
disp("x3: "+string(x3_15th_rounded)+""")

```

```

        if x1_15th_rounded==x1_14th_rounded & x2_15th_rounded==x2_14th_rounded &
x3_15th_rounded==x3_14th_rounded then
            disp("")
            disp("CONDITION MET: Two successive approximations are identical.")
            disp("x1: "+string(x1_15th_rounded)+"")
            disp("x2: "+string(x2_15th_rounded)+"")
            disp("x3: "+string(x3_15th_rounded)+"")
            disp("")
            disp("Restart the program? Input Yes to restart and No to abort.")
            disp("")
            ANSWER_RESTART=input(" Your Choice: ")
            if ANSWER_RESTART==1 then
                continue
            elseif ANSWER_RESTART==0 then
                clc
                disp("Thank you for using our program!")
                disp("For any inquiries, please contact Head Developer through this email:")
                disp("bernardoraevon@gmail.com")
                abort
            end
        end
end

// SIXTEENTH ITERATION

x1_16th=(c1+(a12*x2_15th_rounded)+(a13*x3_15th_rounded))/a11
x1_16th_1=x1_16th*1000
x1_16th_2=round(x1_16th_1)
x1_16th_rounded=x1_16th_2/1000

x2_16th=(c2+(a21*x1_16th_rounded)+(a23*x3_15th_rounded))/a22
x2_16th_1=x2_16th*1000
x2_16th_2=round(x2_16th_1)
x2_16th_rounded=x2_16th_2/1000

x3_16th=(c3+(a31*x1_16th_rounded)+(a32*x2_16th_rounded))/a33
x3_16th_1=x3_16th*1000
x3_16th_2=round(x3_16th_1)
x3_16th_rounded=x3_16th_2/1000

disp("SIXTEENTH ITERATION")
disp("x1: "+string(x1_16th_rounded)+"")
disp("x2: "+string(x2_16th_rounded)+"")
disp("x3: "+string(x3_16th_rounded)+"")

        if x1_16th_rounded==x1_15th_rounded & x2_16th_rounded==x2_15th_rounded &
x3_16th_rounded==x3_15th_rounded then
            disp("")
            disp("CONDITION MET: Two successive approximations are identical.")
            disp("x1: "+string(x1_16th_rounded)+"")
            disp("x2: "+string(x2_16th_rounded)+"")
            disp("x3: "+string(x3_16th_rounded)+"")
            disp("")
            disp("Restart the program? Input Yes to restart and No to abort.")
            disp("")
            ANSWER_RESTART=input(" Your Choice: ")
            if ANSWER_RESTART==1 then

```



```

        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// SEVENTEENTH ITERATION

x1_17th=(c1+(a12*x2_16th_rounded)+(a13*x3_16th_rounded))/a11
x1_17th_1=x1_17th*1000
x1_17th_2=round(x1_17th_1)
x1_17th_rounded=x1_17th_2/1000

x2_17th=(c2+(a21*x1_17th_rounded)+(a23*x3_16th_rounded))/a22
x2_17th_1=x2_17th*1000
x2_17th_2=round(x2_17th_1)
x2_17th_rounded=x2_17th_2/1000

x3_17th=(c3+(a31*x1_17th_rounded)+(a32*x2_17th_rounded))/a33
x3_17th_1=x3_17th*1000
x3_17th_2=round(x3_17th_1)
x3_17th_rounded=x3_17th_2/1000

disp("SEVENTEENTH ITERATION")
disp("x1: "+string(x1_17th_rounded)+""")
disp("x2: "+string(x2_17th_rounded)+""")
disp("x3: "+string(x3_17th_rounded)+""")

if x1_17th_rounded==x1_16th_rounded & x2_17th_rounded==x2_16th_rounded &
x3_17th_rounded==x3_16th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_17th_rounded)+""")
    disp("x2: "+string(x2_17th_rounded)+""")
    disp("x3: "+string(x3_17th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// EIGHTEENTH ITERATION

```

```

x1_18th=(c1+(a12*x2_17th_rounded)+(a13*x3_17th_rounded))/a11
x1_18th_1=x1_18th*1000
x1_18th_2=round(x1_18th_1)
x1_18th_rounded=x1_18th_2/1000

x2_18th=(c2+(a21*x1_18th_rounded)+(a23*x3_17th_rounded))/a22
x2_18th_1=x2_18th*1000
x2_18th_2=round(x2_18th_1)
x2_18th_rounded=x2_18th_2/1000

x3_18th=(c3+(a31*x1_18th_rounded)+(a32*x2_18th_rounded))/a33
x3_18th_1=x3_18th*1000
x3_18th_2=round(x3_18th_1)
x3_18th_rounded=x3_18th_2/1000

disp("EIGHTEENTH ITERATION")
disp("x1: "+string(x1_18th_rounded)+""")
disp("x2: "+string(x2_18th_rounded)+""")
disp("x3: "+string(x3_18th_rounded)+""")

if x1_18th_rounded==x1_17th_rounded & x2_18th_rounded==x2_17th_rounded &
x3_18th_rounded==x3_17th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_18th_rounded)+""")
    disp("x2: "+string(x2_18th_rounded)+""")
    disp("x3: "+string(x3_18th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input(" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// NINETEENTH ITERATION

x1_19th=(c1+(a12*x2_18th_rounded)+(a13*x3_18th_rounded))/a11
x1_19th_1=x1_19th*1000
x1_19th_2=round(x1_19th_1)
x1_19th_rounded=x1_19th_2/1000

x2_19th=(c2+(a21*x1_19th_rounded)+(a23*x3_18th_rounded))/a22
x2_19th_1=x2_19th*1000
x2_19th_2=round(x2_19th_1)
x2_19th_rounded=x2_19th_2/1000

x3_19th=(c3+(a31*x1_19th_rounded)+(a32*x2_19th_rounded))/a33
x3_19th_1=x3_19th*1000

```

```

x3_19th_2=round(x3_19th_1)
x3_19th_rounded=x3_19th_2/1000

disp("NINETEENTH ITERATION")
disp("x1: "+string(x1_19th_rounded)+""")
disp("x2: "+string(x2_19th_rounded)+""")
disp("x3: "+string(x3_19th_rounded)+""")

if x1_19th_rounded==x1_18th_rounded & x2_19th_rounded==x2_18th_rounded &
x3_19th_rounded==x3_18th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_19th_rounded)+""")
    disp("x2: "+string(x2_19th_rounded)+""")
    disp("x3: "+string(x3_19th_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTIETH ITERATION

x1_20th=(c1+(a12*x2_19th_rounded)+(a13*x3_19th_rounded))/a11
x1_20th_1=x1_20th*1000
x1_20th_2=round(x1_20th_1)
x1_20th_rounded=x1_20th_2/1000

x2_20th=(c2+(a21*x1_20th_rounded)+(a23*x3_19th_rounded))/a22
x2_20th_1=x2_20th*1000
x2_20th_2=round(x2_20th_1)
x2_20th_rounded=x2_20th_2/1000

x3_20th=(c3+(a31*x1_20th_rounded)+(a32*x2_20th_rounded))/a33
x3_20th_1=x3_20th*1000
x3_20th_2=round(x3_20th_1)
x3_20th_rounded=x3_20th_2/1000

disp("TWENTIETH ITERATION")
disp("x1: "+string(x1_20th_rounded)+""")
disp("x2: "+string(x2_20th_rounded)+""")
disp("x3: "+string(x3_20th_rounded)+""")

if x1_20th_rounded==x1_19th_rounded & x2_20th_rounded==x2_19th_rounded &
x3_20th_rounded==x3_19th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")

```

```

disp("x1: "+string(x1_20th_rounded)+"" )
disp("x2: "+string(x2_20th_rounded)+"" )
disp("x3: "+string(x3_20th_rounded)+"" )
disp("")
disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
end

```

// TWENTY-FIRST ITERATION

```

x1_21st=(c1+(a12*x2_20th_rounded)+(a13*x3_20th_rounded))/a11
x1_21st_1=x1_21st*1000
x1_21st_2=round(x1_21st_1)
x1_21st_rounded=x1_21st_2/1000

```

```

x2_21st=(c2+(a21*x1_21st_rounded)+(a23*x3_20th_rounded))/a22
x2_21st_1=x2_21st*1000
x2_21st_2=round(x2_21st_1)
x2_21st_rounded=x2_21st_2/1000

```

```

x3_21st=(c3+(a31*x1_21st_rounded)+(a32*x2_21st_rounded))/a33
x3_21st_1=x3_21st*1000
x3_21st_2=round(x3_21st_1)
x3_21st_rounded=x3_21st_2/1000

```

```

disp("TWENTY-FIRST ITERATION")
disp("x1: "+string(x1_21st_rounded)+"" )
disp("x2: "+string(x2_21st_rounded)+"" )
disp("x3: "+string(x3_21st_rounded)+"" )

```

```

if x1_21st_rounded==x1_20th_rounded & x2_21st_rounded==x2_20th_rounded &
x3_21st_rounded==x3_20th_rounded then

```

```

    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_21st_rounded)+"" )
    disp("x2: "+string(x2_21st_rounded)+"" )
    disp("x3: "+string(x3_21st_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
    end
end

```

```

        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-SECOND ITERATION

x1_22nd=(c1+(a12*x2_21st_rounded)+(a13*x3_21st_rounded))/a11
x1_22nd_1=x1_22nd*1000
x1_22nd_2=round(x1_22nd_1)
x1_22nd_rounded=x1_22nd_2/1000

x2_22nd=(c2+(a21*x1_22nd_rounded)+(a23*x3_21st_rounded))/a22
x2_22nd_1=x2_22nd*1000
x2_22nd_2=round(x2_22nd_1)
x2_22nd_rounded=x2_22nd_2/1000

x3_22nd=(c3+(a31*x1_22nd_rounded)+(a32*x2_22nd_rounded))/a33
x3_22nd_1=x3_22nd*1000
x3_22nd_2=round(x3_22nd_1)
x3_22nd_rounded=x3_22nd_2/1000

disp("TWENTY-SECOND ITERATION")
disp("x1: "+string(x1_22nd_rounded)+"")
disp("x2: "+string(x2_22nd_rounded)+"")
disp("x3: "+string(x3_22nd_rounded)+"")

if x1_22nd_rounded==x1_21st_rounded & x2_22nd_rounded==x2_21st_rounded &
x3_22nd_rounded==x3_21st_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_22nd_rounded)+"")
    disp("x2: "+string(x2_22nd_rounded)+"")
    disp("x3: "+string(x3_22nd_rounded)+"")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-THIRD ITERATION

x1_23rd=(c1+(a12*x2_22nd_rounded)+(a13*x3_22nd_rounded))/a11
x1_23rd_1=x1_23rd*1000
x1_23rd_2=round(x1_23rd_1)
x1_23rd_rounded=x1_23rd_2/1000

```

```

x2_23rd=(c2+(a21*x1_23rd_rounded)+(a23*x3_22nd_rounded))/a22
x2_23rd_1=x2_23rd*1000
x2_23rd_2=round(x2_23rd_1)
x2_23rd_rounded=x2_23rd_2/1000

x3_23rd=(c3+(a31*x1_23rd_rounded)+(a32*x2_23rd_rounded))/a33
x3_23rd_1=x3_23rd*1000
x3_23rd_2=round(x3_23rd_1)
x3_23rd_rounded=x3_23rd_2/1000

disp("TWENTY-THIRD ITERATION")
disp("x1: "+string(x1_23rd_rounded)+""")
disp("x2: "+string(x2_23rd_rounded)+""")
disp("x3: "+string(x3_23rd_rounded)+""")

if x1_23rd_rounded==x1_22nd_rounded & x2_23rd_rounded==x2_22nd_rounded &
x3_23rd_rounded==x3_22nd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_23rd_rounded)+""")
    disp("x2: "+string(x2_23rd_rounded)+""")
    disp("x3: "+string(x3_23rd_rounded)+""")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-FOURTH ITERATION

x1_24th=(c1+(a12*x2_23rd_rounded)+(a13*x3_23rd_rounded))/a11
x1_24th_1=x1_24th*1000
x1_24th_2=round(x1_24th_1)
x1_24th_rounded=x1_24th_2/1000

x2_24th=(c2+(a21*x1_24th_rounded)+(a23*x3_23rd_rounded))/a22
x2_24th_1=x2_24th*1000
x2_24th_2=round(x2_24th_1)
x2_24th_rounded=x2_24th_2/1000

x3_24th=(c3+(a31*x1_24th_rounded)+(a32*x2_24th_rounded))/a33
x3_24th_1=x3_24th*1000
x3_24th_2=round(x3_24th_1)
x3_24th_rounded=x3_24th_2/1000

disp("TWENTY-FOURTH ITERATION")

```

```

disp("x1: "+string(x1_24th_rounded)+"" )
disp("x2: "+string(x2_24th_rounded)+"" )
disp("x3: "+string(x3_24th_rounded)+"" )

if x1_24th_rounded==x1_23rd_rounded & x2_24th_rounded==x2_23rd_rounded &
x3_24th_rounded==x3_23rd_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_24th_rounded)+"" )
    disp("x2: "+string(x2_24th_rounded)+"" )
    disp("x3: "+string(x3_24th_rounded)+"" )
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

// TWENTY-FIFTH ITERATION

x1_25th=(c1+(a12*x2_24th_rounded)+(a13*x3_24th_rounded))/a11
x1_25th_1=x1_25th*1000
x1_25th_2=round(x1_25th_1)
x1_25th_rounded=x1_25th_2/1000

x2_25th=(c2+(a21*x1_25th_rounded)+(a23*x3_24th_rounded))/a22
x2_25th_1=x2_25th*1000
x2_25th_2=round(x2_25th_1)
x2_25th_rounded=x2_25th_2/1000

x3_25th=(c3+(a31*x1_25th_rounded)+(a32*x2_25th_rounded))/a33
x3_25th_1=x3_25th*1000
x3_25th_2=round(x3_25th_1)
x3_25th_rounded=x3_25th_2/1000

disp("TWENTY-FIFTH ITERATION")
disp("x1: "+string(x1_25th_rounded)+"" )
disp("x2: "+string(x2_25th_rounded)+"" )
disp("x3: "+string(x3_25th_rounded)+"" )

if x1_25th_rounded==x1_24th_rounded & x2_25th_rounded==x2_24th_rounded &
x3_25th_rounded==x3_24th_rounded then
    disp("")
    disp("CONDITION MET: Two successive approximations are identical.")
    disp("x1: "+string(x1_25th_rounded)+"" )
    disp("x2: "+string(x2_25th_rounded)+"" )
    disp("x3: "+string(x3_25th_rounded)+"" )
    disp("")

```

```

disp("Restart the program? Input Yes to restart and No to abort.")
disp("")
ANSWER_RESTART=input (" Your Choice: ")
if ANSWER_RESTART==1 then
    continue
elseif ANSWER_RESTART==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end

// CONDITION: MUST BE STRICTLY DIAGONALLY DOMINANT

elseif x1_divergence_final_checking>x1_divergence_initial_checking &
x2_divergence_final_checking>x2_divergence_initial_checking &
x3_divergence_final_checking>x3_divergence_initial_checking then
    disp("")
    disp("ERROR: Divergences of approximations are occurring! This may be because of the matrix
provided, which may not be strictly diagonally dominant!")
    disp("RECOMMENDED ACTION: Interchange the rows inside your matrix such that the matrix is
strictly diagonally dominant.")
    disp("IMPORTANT NOTE: This conditional error may not always be the case. Although it is important
to take note of that Jacobi Method always CONVERGES.")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
else
    disp("")
    disp("ERROR: EXCEEDED THE APPROXIMATING CAPABILITIES OF THE PROGRAM!")
    disp("RECOMMENDED ACTION: Switch to Jacobi Method. You can also wait for the next update of
this program.")
    disp("For any inquiries, please contact Head Developer through email: bernardoraevon@gmail.com")
    disp("")
    disp("Restart the program? Input Yes to restart and No to abort.")
    disp("")
    ANSWER_RESTART=input (" Your Choice: ")
    if ANSWER_RESTART==1 then
        continue
    elseif ANSWER_RESTART==0 then
        clc
        disp("Thank you for using our program!")
        disp("For any inquiries, please contact Head Developer through this email:")
        disp("bernardoraevon@gmail.com")
        abort
    end
end

```



```
        end
    end
end
end
elseif ANSWER0==0 then
    clc
    disp("Thank you for using our program!")
    disp("For any inquiries, please contact Head Developer through this email:")
    disp("bernardoraevon@gmail.com")
    abort
end
clock=clock-1;
end
```

III. Program Instructions

How to Use G6-SLEIMA 1.0.1:

Main Page

The user will be prompted to either input “Yes” or “No” and depending on the decision of the user, the program will either proceed or abort.

Program Mode Selection

The user will have the option of either choose between the two methods available: Jacobi Method and Gauss-Seidel Method. This is done by inputting either “a” or “b”.

Matrix Mode Selection

Similar to the instructions of the previous program mode selection, the user will have the option of either proceeding with a 2x2 matrix or 3x3 matrix. This is done by inputting either “a” or “b”.

Inputting Values and Constants Required

Before the program starts approximating, the user will be required to input the values and constants inside the matrix of their choice.

eg. *In a 2x2 matrix*

a11 = corresponds to the coefficient of X_1 of Equation 1

a12 = corresponds to the coefficient of X_2 of Equation 1

c1 = corresponds to the constant of Equation 1

a21 = corresponds to the coefficient of X_1 of Equation 2

a22 = corresponds to the coefficient of X_2 of Equation 2

c2 = corresponds to the constant of Equation 2

Therefore, a system of...

$$2x_1 + x_2 = 3$$

$$x_1 + 2x_2 = 2$$

Must be inputted just like this:

$$a_{11} = 2$$

$$a_{21} = 1$$

$$a_{12} = 1$$

$$a_{22} = 2$$

$$c_1 = 3$$

$$c_2 = 2$$

IV. Sample Output

MAIN PAGE

```
Scilab 6.1.1 Console ? ? X

"Welcome to Group 6 System of Linear Equations Iterative Methods Approximator 1.0.1 (G6-SLE

"Version: 1.0.1 (TRIAL VERSION)"

""

"Current Version Capabilities:"

"Jacobi Method: Can approximate up to 25th approximation."

"Gauss-Seidel Method: Can approximate up to 25th approximation."

""

""

Start program? input Yes to start and No to abort:
```

ABORT PAGE

```
Scilab 6.1.1 Console ? ? X

"Thank you for using our program!"

"For any inquiries, please contact Head Developer through this email:"

"bernardoraevon@gmail.com"

-->
```

PROGRAM MODE SELECTION PAGE

Scilab 6.1.1 Console

? ↗ ✕

"Please choose desired program mode:"

"(a) Jacobi Method"

"(b) Gauss-Seidel Method"

""

Your choice: a

MATRIX SELECTION PAGE

Scilab 6.0.2 Console

Program Mode: Jacobi Method

What are the parameters of your system/matrix?

(a) 2x2

(b) 3x3

Your choice:

Scilab 6.0.2 Console

Program Mode: Gauss-Seidel Method

What are the parameters of your system/matrix?

(a) 2x2

(b) 3x3

Your choice:

JACOBI METHOD (2X2 MATRIX)

Scilab 6.1.1 Console

```
"Program Mode: Jacobi Method"

"System/Matrix Size: 2x2"

"Instructions: Please input the values of your matrix."

""

"First Equation"

""
Please input all:
```

Scilab 6.1.1 Console

```
"First Equation"

""
Please input all: 2
Please input a12: 1
Please input c1: 3

"Second Equation"

""
Please input a21: 1
Please input a22: 5
Please input c2: 1

"FIRST ITERATION"

"x1: 1.5"
"x2: 0.2"

"SECOND ITERATION"

"x1: 1.4"
"x2: -0.1"

"CONDITION MET: Two successive approximations are identical."

"x1: 1.556"

"x2: -0.111"

""

"Restart the program? Input Yes to restart and No to abort."

""
Your Choice:
```

JACOBI METHOD (3X3 MATRIX)

Scilab 6.1.1 Console

? ? X

```
"Program Mode: Gauss-Seidel Method"

"System/Matrix Size: 3x3"

"Instructions: Please input the values of your matrix."

""

"First Equation"

""

Please input all:
```

Scilab 6.1.1 Console

? ?

```
"First Equation"

""

Please input all: 5

Please input a12: -2

Please input a13: 3

Please input c1: -1

"Second Equation"

""

Please input a21: -3

Please input a22: 9

Please input a23: 1

Please input c2: 2

"Third Equation"

""

Please input a31: 2

Please input a32: -1

Please input a33: -7

Please input c3: 3
```

"FIRST ITERATION"

"x1: -0.2"

"x2: 0.156"

"x3: -0.508"

"SECOND ITERATION"

"x1: 0.167"

"x2: 0.334"

"x3: -0.429"

"THIRD ITERATION"

"x1: 0.191"

"x2: 0.334"

"x3: -0.422"

"FOURTH ITERATION"

"x1: 0.187"

"x2: 0.331"

"x3: -0.422"

"CONDITION MET: Two successive approximations are identical."

"x1: 0.186"

"x2: 0.331"

"x3: -0.423"

""

"Restart the program? Input Yes to restart and No to abort."

""

Your Choice:

GAUSS-SEIDEL METHOD (2X2 MATRIX)

Scilab 6.1.1 Console

? ? X

```
"Program Mode:  Gauss-Seidel Method"
```

```
"System/Matrix Size:  2x2"
```

```
"Instructions: Please input the values of your matrix."
```

```
""
```

```
"First Equation"
```

```
""
```

```
Please input a11:  2
```

```
Please input a12:  1
```

```
Please input c1:  3
```

```
"Second Equation"
```

```
""
```

```
Please input a21:  1
```

```
Please input a22:  5
```

```
Please input c2:  1
```

```
"FIRST ITERATION"
```

```
"x1:  1.5"
```

```
"x2:  -0.1"
```

```
"SECOND ITERATION"
```

```
"x1:  1.55"
```

```
"x2:  -0.11"
```

```
"THIRD ITERATION"
```

```
"x1:  1.555"
```

```
"x2:  -0.111"
```

```
"FOURTH ITERATION"
```

```
"x1:  1.556"
```

```
"x2:  -0.111"
```

```
"FIFTH ITERATION"
```

```
"x1:  1.556"
```

```
"x2:  -0.111"
```



```
"CONDITION MET: Two successive approximations are identical."

"x1: 1.556"

"x2: -0.111"

""

"Restart the program? Input Yes to restart and No to abort."

""
Your Choice:
```

GAUSS-SEIDEL METHOD (3X3 MATRIX)

Scilab 6.1.1 Console

```
"Program Mode: Gauss-Seidel Method"

"System/Matrix Size: 3x3"

"Instructions: Please input the values of your matrix."

""
```

```
"First Equation"

""
Please input a11: 5
Please input a12: -2
Please input a13: 3
Please input c1: -1

"Second Equation"

""
Please input a21: -3
Please input a22: 9
Please input a23: 1
Please input c2: 2

"Third Equation"

""
Please input a31: 2
Please input a32: -1
Please input a33: -7
Please input c3: 3
```

"FIRST ITERATION"

"x1: -0.2"

"x2: 0.156"

"x3: -0.508"

"SECOND ITERATION"

"x1: 0.167"

"x2: 0.334"

"x3: -0.429"

"THIRD ITERATION"

"x1: 0.191"

"x2: 0.334"

"x3: -0.422"

"FOURTH ITERATION"

"x1: 0.187"

"x2: 0.331"

"x3: -0.422"

"CONDITION MET: Two successive approximations are identical."

"x1: 0.186"

"x2: 0.331"

"x3: -0.423"

""

"Restart the program? Input Yes to restart and No to abort."

""

Your Choice:

SPECIAL FEATURE: “MATRIX NOT STRICTLY DIAGONALLY DOMINANT” ERROR DETECTOR



The screenshot shows the Scilab 6.0.2 Console window. The title bar reads 'Scilab 6.0.2 Console'. The menu bar includes 'File', 'Edit', 'Control', and 'Applications'. The toolbar contains various icons for file operations and execution. The console text is as follows:

```
x2:  -9.655D+16

TWENTY-THIRD ITERATION

x1:  -4.827D+17
x2:  -6.758D+17

TWENTY-FOURTH ITERATION

x1:  -3.379D+18
x2:  -3.379D+18

TWENTY-FIFTH ITERATION

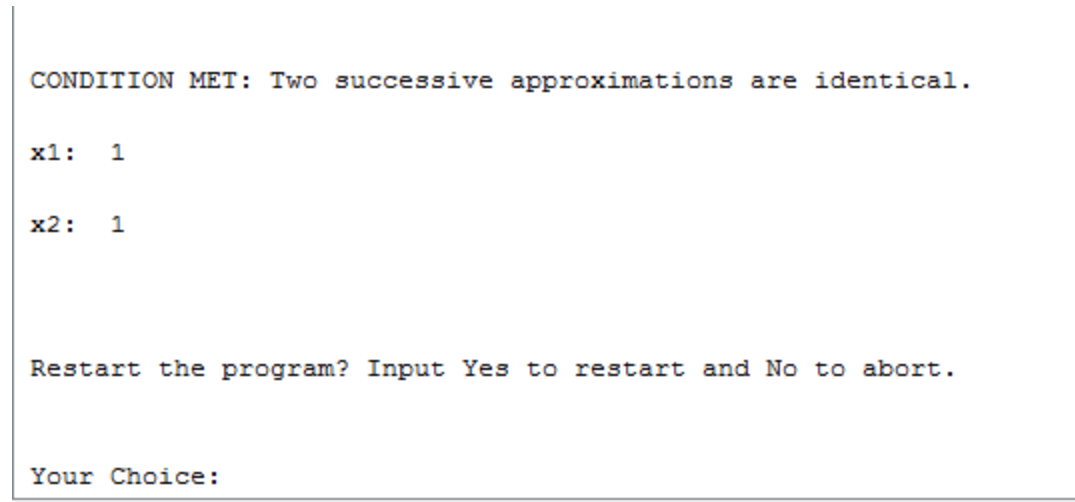
x1:  -1.690D+19
x2:  -2.365D+19

ERROR: Divergences of approximations are occurring! This may be because of the matrix provided, which may not be strictly diagonally dominant!
RECOMMENDED ACTION: Interchange the rows inside your matrix such that the matrix is strictly diagonally dominant.
IMPORTANT NOTE: This conditional error may not always be the case. Although it is important to take note of that Jacobi Method always CONVERGES.

Restart the program? Input Yes to restart and No to abort.

Your Choice: |
```

SPECIAL FEATURE: “CLOCK” FEATURE OR RESTART PROGRAM PROMPT



The screenshot shows a console window with the following text:

```
CONDITION MET: Two successive approximations are identical.

x1:  1
x2:  1

Restart the program? Input Yes to restart and No to abort.

Your Choice:
```

Due to being designed in Scilab 6.0.2, the console screen appears much more cleaner when using Scilab 6.0.2 rather than the current updated version of Scilab. In Scilab 6.1.1, quotation marks are displayed which make it look messier whereas compared to Scilab 6.0.2, quotation marks are not displayed on the console screen.

– Head Developer’s Remark

V. Program Accuracy

JACOBI METHOD

- 2x2 Matrix

Accuracy Test # 1

- $2x + y = 3$
- $x + 5y = 1$

G6-SLEIMA 1.0.1 Results:

```
Scilab 6.0.2 Console
File Edit Control Applications ?
Scilab 6.0.2 Console
x2: -0.108

SIXTH ITERATION
x1: 1.554
x2: -0.111

SEVENTH ITERATION
x1: 1.556
x2: -0.111

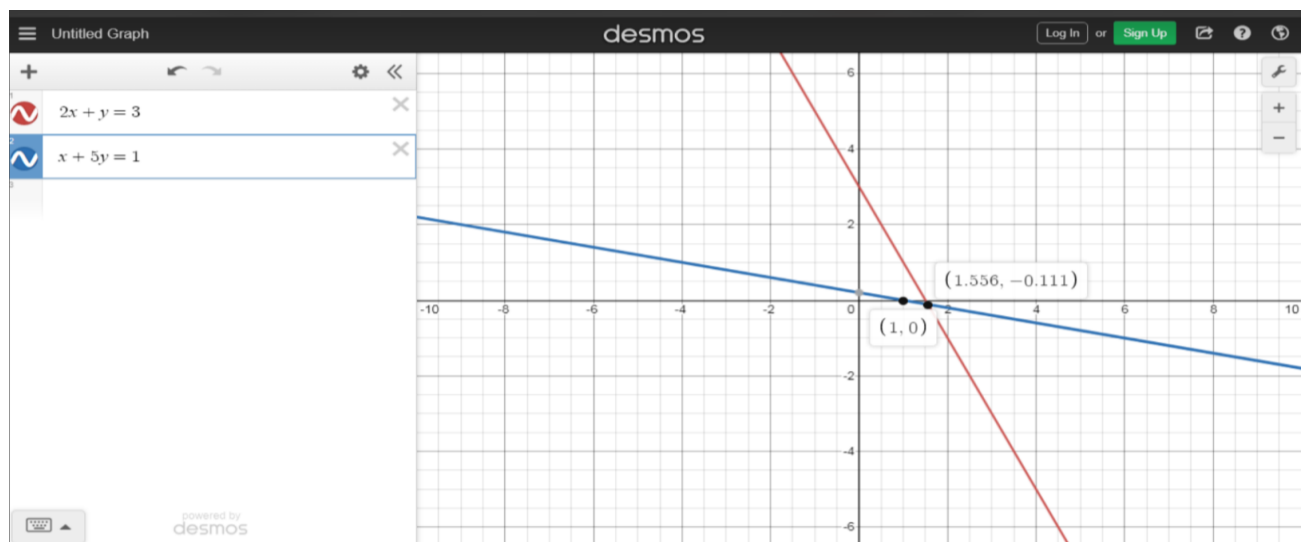
EIGHTH ITERATION
x1: 1.556
x2: -0.111

CONDITION MET: Two successive approximations are identical.
x1: 1.556
x2: -0.111

Restart the program? Input Yes to restart and No to abort.

Your Choice: |
```

Desmos Graphing Calculator Results:



Accuracy Test # 2

- $2x - y = 3$
- $x + 6 = -2$

G6-SLEIMA 1.0.1 Results:

```
File Edit Control Applications ?
Scilab 6.0.2 Console
x2: -0.537

SIXTH ITERATION

x1: 1.232
x2: -0.539

SEVENTH ITERATION

x1: 1.231
x2: -0.539

EIGHTH ITERATION

x1: 1.231
x2: -0.539

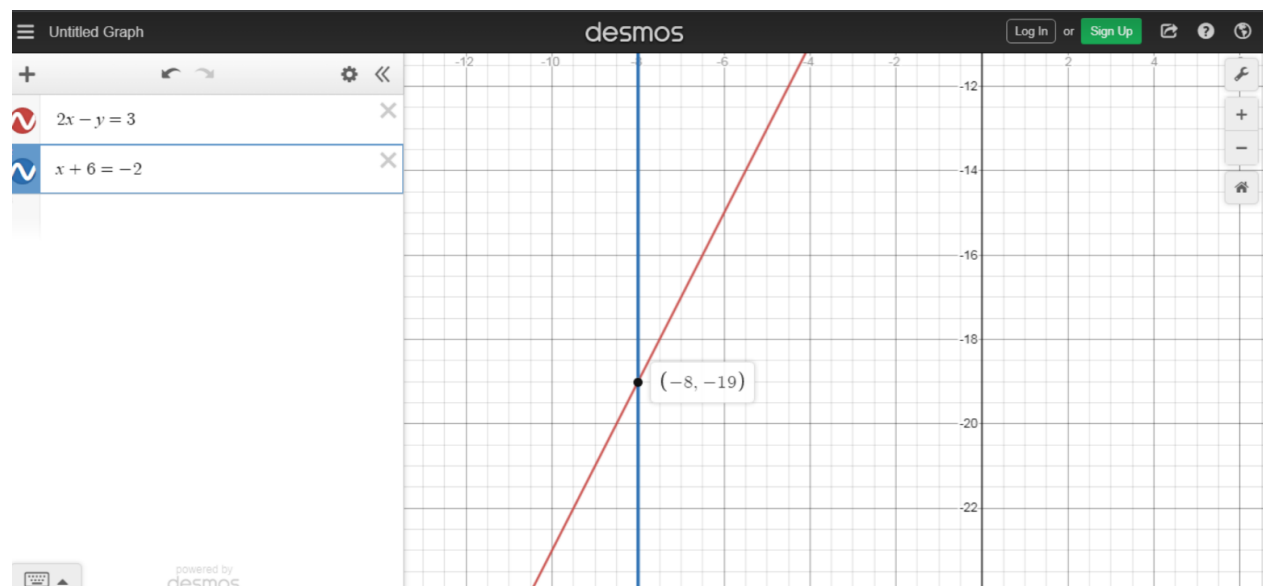
CONDITION MET: Two successive approximations are identical.

x1: 1.231
x2: -0.539

Restart the program? Input Yes to restart and No to abort.

Your Choice: |
```

Desmos Graphing Calculator Results:



- 3X3 Matrix

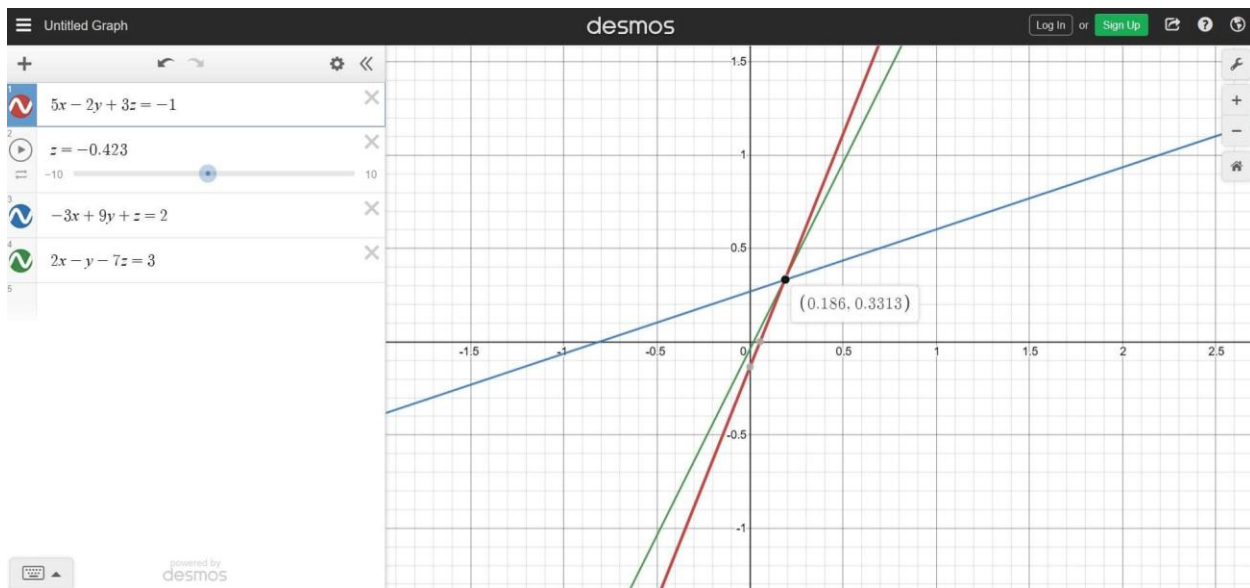
Accuracy Test # 1

- $5x - 2y + 3z = 1$
- $-3x + 9y + z = 2$
- $2x - y - 7z = 3$

G6-SLEIMA 1.0.1 Results:

```
Schlab 6.1.1 Console
" "
"x3: -0.424"
"SIXTH ITERATION"
"x1: 0.186"
"x2: 0.331"
"x3: -0.423"
"SEVENTH ITERATION"
"x1: 0.186"
"x2: 0.331"
"x3: -0.423"
" "
"CONDITION MET: Two successive approximations are identical."
"x1: 0.186"
"x2: 0.331"
"x3: -0.423"
" "
"Restart the program? Input Yes to restart and No to abort."
" "
Your Choice:
```

Desmos Graphing Calculator Results:



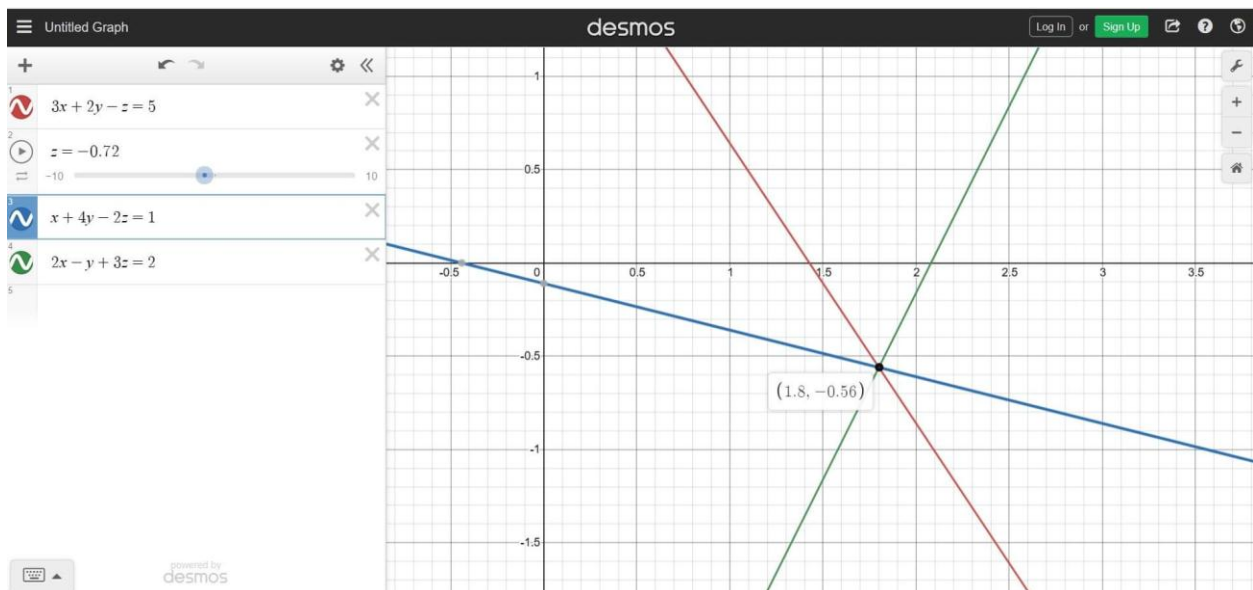
Accuracy Test # 2

- $3x + 2y - z = 5$
- $x + 4y - 2z = 1$
- $2x - y + 3z = 2$

G6-SLEIMA 1.0.1 Results:

```
Scilab 6.1.1 Console
x3: -0.719"
"EIGHTEENTH ITERATION"
x1: 1.8"
x2: -0.56"
x3: -0.72"
"NINETEENTH ITERATION"
x1: 1.8"
x2: -0.56"
x3: -0.72"
""
"CONDITION MET: Two successive approximations are identical."
x1: 1.8"
x2: -0.56"
x3: -0.72"
""
"Restart the program? Input Yes to restart and No to abort."
""
Your Choice:
```

Desmos Graphing Calculator Results:



GAUSS-SEIDEL METHOD

- 2x2 Matrix

Accuracy Test # 1

- $2x + y = 3$
- $x + 5y = 1$

G6–SLEIMA 1.0.1 Results:

The screenshot displays the Scilab 6.1.1 software interface. The main window shows the console output of the Gauss-Seidel method iterations. The iterations are as follows:

```
"SECOND ITERATION"
"x1: 1.55"
"x2: -0.11"

"THIRD ITERATION"
"x1: 1.555"
"x2: -0.111"

"FOURTH ITERATION"
"x1: 1.556"
"x2: -0.111"

"FIFTH ITERATION"
"x1: 1.556"
"x2: -0.111"

""

"CONDITION MET: Two successive approximations are identical."
"x1: 1.556"
"x2: -0.111"
```

The Variable Browser on the right shows the following variables:

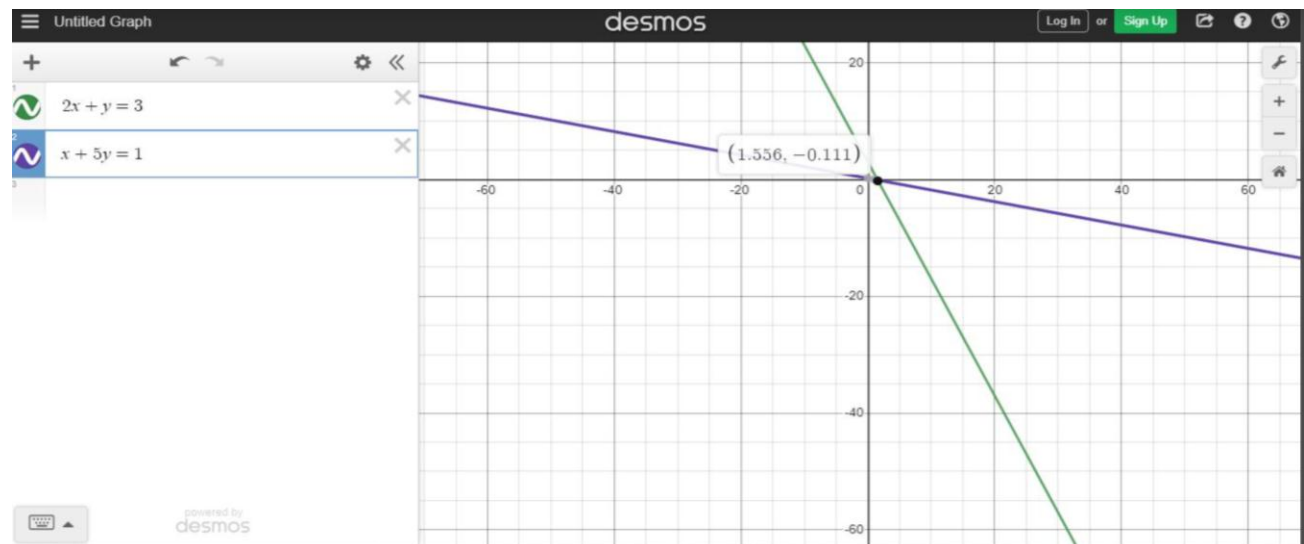
Name	Value	Type	Visibility	Memory
A	123	Double	local	200 B
ANSW...	1	Double	local	200 B
ANSW...	321	Double	local	200 B
ANSW...	123	Double	local	200 B
B	213	Double	local	200 B
NO	0	Double	local	200 B
No	0	Double	local	200 B
YES	1	Double	local	200 B
Yes	1	Double	local	200 B

The Command History on the right shows the following commands:

```
a
a11=2
a11 = 2
2
-dc
-yes
b
-a
-2
-1
-3
-1
5
1
```

The News feed on the right shows a message: "Scilab 6.1.1 has been released!!!".

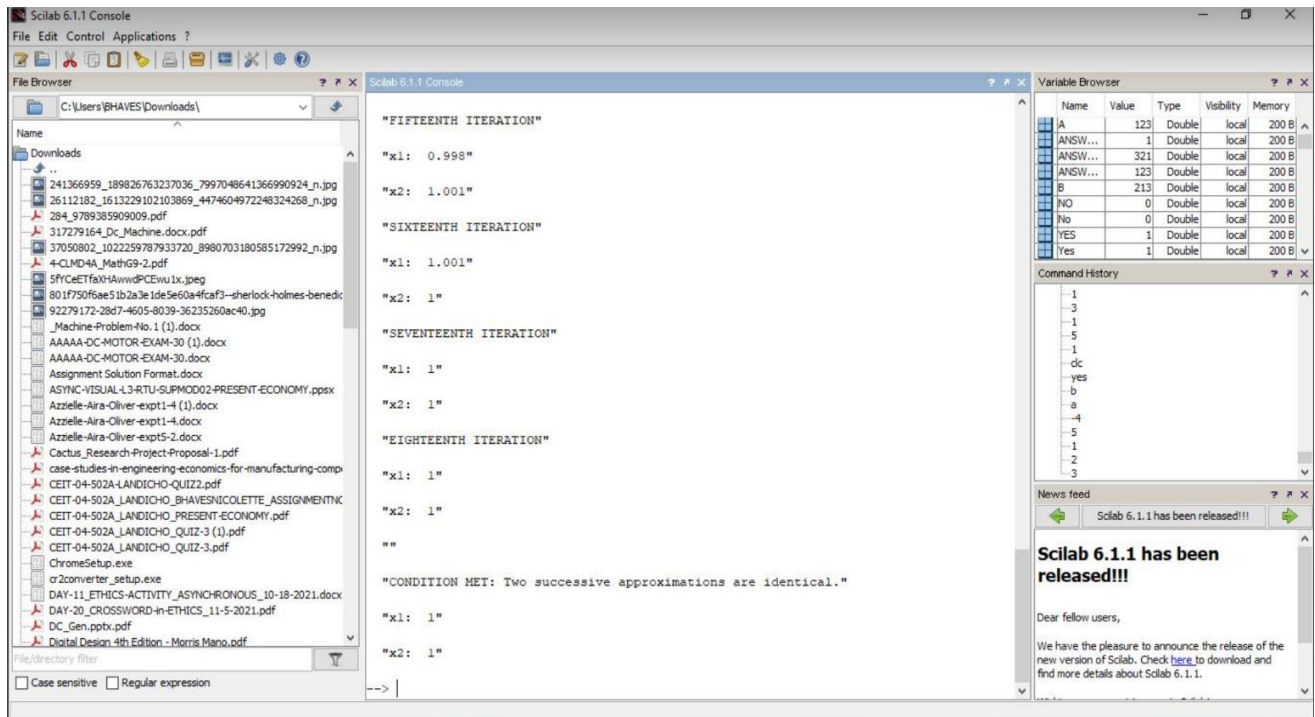
Desmos Graphing Calculator Results:



Accuracy Test # 2

- $-4x + 5y = 1$
- $x + 2y = 3$

G6–SLEIMA 1.0.1 Results:



Scilab 6.1.1 Console

File Edit Control Applications ?

File Browser

C:\Users\BHAVES\Downloads\

Name

Downloads

241366959_189826763237036_7997048641366990924_n.jpg

26112182_1613229102103869_4474604972248324268_n.jpg

284_9789385909009.pdf

317279164_Dc_Machine.docx.pdf

37050802_1022259787933720_8980703180585172992_n.jpg

4-CLMD4A_MathG9-2.pdf

5f1CeETfXhAawvDPCEvu1x.jpeg

8017750f6ae51b2a3e1de5e60a4fca3-sherlock-holmes-benedi

92279172-28d7-4605-8039-36235260ac40.jpg

_Machine-Problem-No.1 (1).docx

AAAAA-DC-MOTOR-EXAM-30 (1).docx

AAAAA-DC-MOTOR-EXAM-30.docx

Assignment Solution Format.docx

ASYNCR-VISUAL-4.3-RTU-SUPMOD02-PRESENT-ECONOMY.pptx

Azzelle-Aira-Oliver-expt1-4 (1).docx

Azzelle-Aira-Oliver-expt1-4.docx

Azzelle-Aira-Oliver-expt5-2.docx

Cactus_Research-Project-Proposal-1.pdf

case-studies-in-engineering-economics-for-manufacturing-comp

CEIT-04-502A_LANDICHO-QUIZ2.pdf

CEIT-04-502A_LANDICHO_BHAVESNICOLETTE_ASSIGNMENTNK

CEIT-04-502A_LANDICHO_PRESENT-ECONOMY.pdf

CEIT-04-502A_LANDICHO-QUIZ-3 (1).pdf

CEIT-04-502A_LANDICHO-QUIZ-3.pdf

ChromeSetup.exe

cr2converter_setup.exe

DAY-11_ETHICS-ACTIVITY-ASYNCHRONOUS_10-18-2021.docx

DAY-20_CROSSWORD-in-ETHICS_11-5-2021.pdf

DC_Gen.pptx.pdf

Digital Design 4th Edition - Morris Mano.pdf

File Directory filter

☐ Case sensitive ☐ Regular expression

Scilab 6.1.1 Console

"FIFTEENTH ITERATION"

"x1: 0.998"

"x2: 1.001"

"SIXTEENTH ITERATION"

"x1: 1.001"

"x2: 1"

"SEVENTEENTH ITERATION"

"x1: 1"

"x2: 1"

"EIGHTEENTH ITERATION"

"x1: 1"

"x2: 1"

"

"CONDITION MET: Two successive approximations are identical."

"x1: 1"

"x2: 1"

--> |

Variable Browser

Name	Value	Type	Visibility	Memory
A	123	Double	local	200 B
ANSW...	1	Double	local	200 B
ANSW...	321	Double	local	200 B
ANSW...	123	Double	local	200 B
B	213	Double	local	200 B
NO	0	Double	local	200 B
No	0	Double	local	200 B
YES	1	Double	local	200 B
Yes	1	Double	local	200 B

Command History

1

3

1

5

1

dc

yes

b

a

4

5

1

2

3

News feed

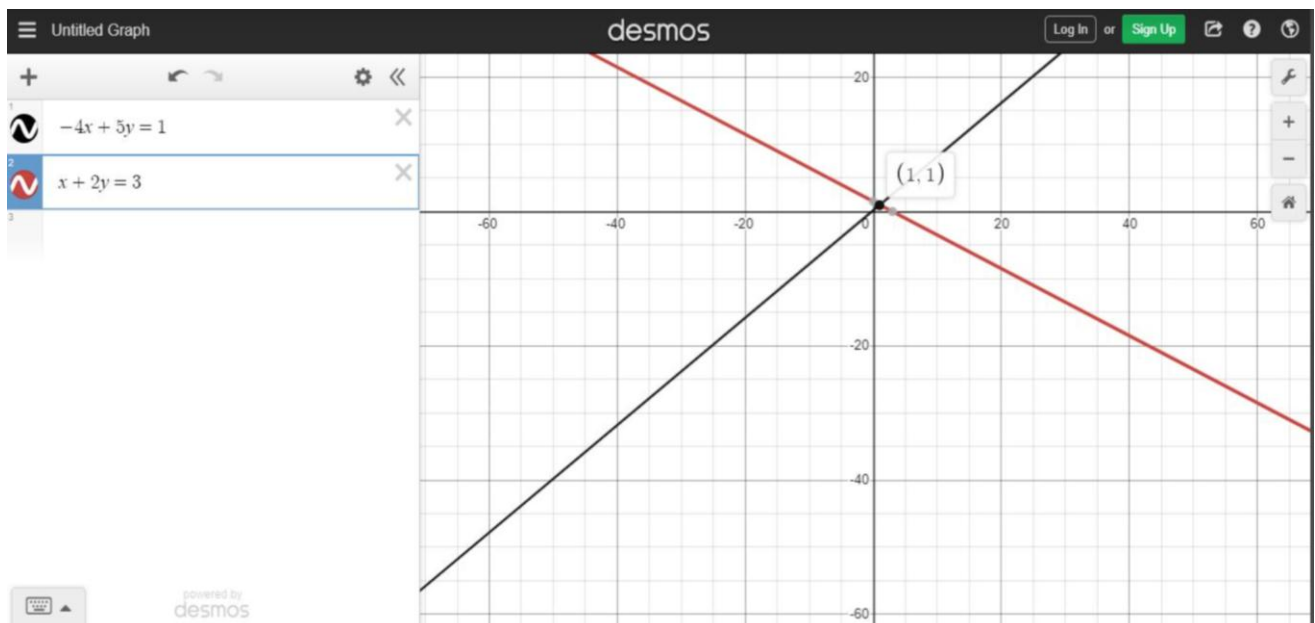
Scilab 6.1.1 has been released!!!

Scilab 6.1.1 has been released!!!!

Dear fellow users,

We have the pleasure to announce the release of the new version of Scilab. Check [here](#) to download and find more details about Scilab 6.1.1.

Desmos Graphing Calculator Results:



- 3X3 Matrix

Accuracy Test # 1

- $5x - 2y + 3z = 1$
- $-3x + 9y + z = 2$
- $2x - y - 7z = 3$

G6-SLEIMA 1.0.1 Results:

```
Scilab 6.1.1 Console
> exec('G6.m')

"x3: -0.422"

"FIFTH ITERATION"

"x1: 0.186"

"x2: 0.331"

"x3: -0.423"

"SIXTH ITERATION"

"x1: 0.186"

"x2: 0.331"

"x3: -0.423"

""

"CONDITION MET: Two successive approximations are identical."

"x1: 0.186"

"x2: 0.331"

"x3: -0.423"

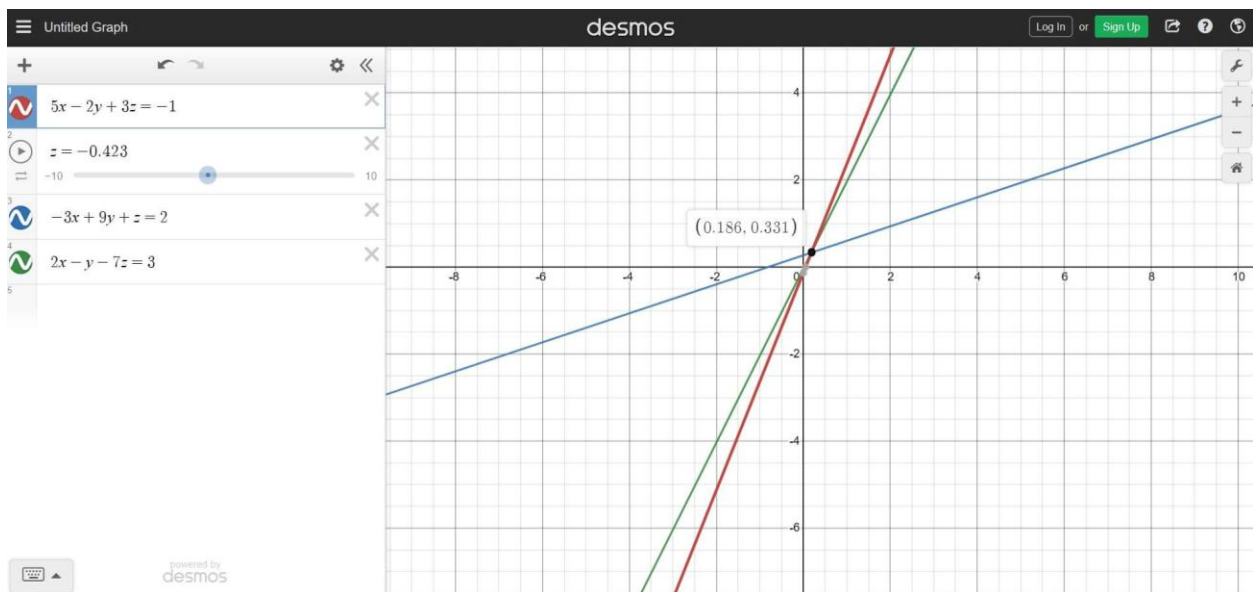
""

"Restart the program? Input Yes to restart and No to abort."

""

Your Choice: |
```

Desmos Graphing Calculator Results:



Accuracy Test # 2

- $3x + 2y - z = 5$
- $x + 4y - 2z = 1$
- $2x - y + 3z = 2$

G6-SLEIMA 1.0.1 Results:

```
Scilab 6.1.1 Console
"""
"x3: -0.719"

"TENTH ITERATION"

"x1: 1.8"

"x2: -0.56"

"x3: -0.72"

"ELEVENTH ITERATION"

"x1: 1.8"

"x2: -0.56"

"x3: -0.72"

""

"CONDITION MET: Two successive approximations are identical."

"x1: 1.8"

"x2: -0.56"

"x3: -0.72"

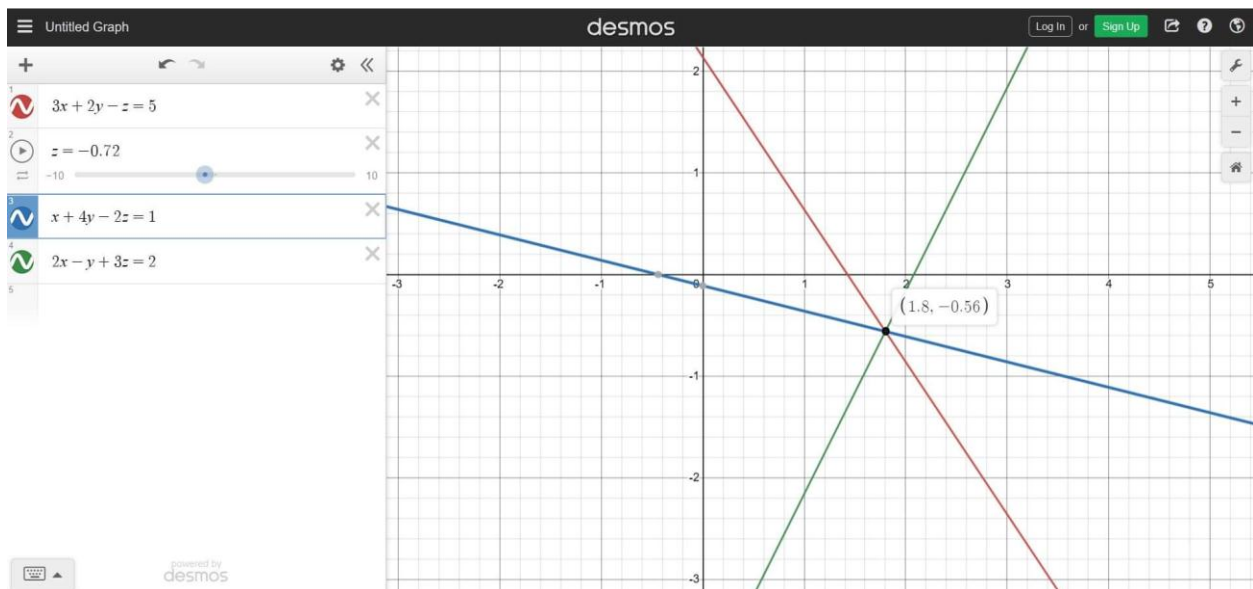
""

"Restart the program? Input Yes to restart and No to abort."

""

Your Choice:
```

Desmos Graphing Calculator Results:



VI. Development Team Contributions

Development Team Members:

- ❖ Bernardo, Raevon Thaddeus C.
 - Head Developer & Programmer
 - Designed the algorithms of the working program
 - Final debugger of the program

- ❖ Bertumen, Charles Jefferson
 - Assistant Developer & Programmer
 - Assisted in conceptualizing the algorithms of the program
 - Assisted in assessing the performance of the trial version
 - Assisted in debugging the program

- ❖ Cabanes, Christine Joy P.
 - Assistant Developer & Programmer
 - Assisted in conceptualizing the algorithms of the program
 - Assisted in assessing the performance of the trial version
 - Assisted in debugging the program

- ❖ Cesar, John Lester M.
 - Assistant Developer & Programmer
 - Assisted in conceptualizing the algorithms of the program
 - Assisted in assessing the performance of the trial version
 - Assisted in debugging the program

- ❖ Landicho, Bhaves Nicolette D.
 - Assistant Developer & Programmer
 - Assisted in conceptualizing the algorithms of the program
 - Assisted in assessing the performance of the trial version
 - Assisted in debugging the program

- ❖ Solis, Johnloyd P.
 - Assistant Developer & Programmer
 - Assisted in conceptualizing the algorithms of the program
 - Assisted in assessing the performance of the trial version
 - Assisted in debugging the program

The development of the program was conducted systematically in order to maximize work efficiency, therefore, the final output was the result of total team effort and cooperation.

Head Developer's Remark